

WORKPLACE SAFETY MANUAL



Welcome On-Line User!

To aid in your navigation around this on-line manual several features are included:

- A hyperlinked *Table of Contents* in your left window that guides users throughout the entire manual
- Each individual *Safe Operating Procedure (SOP)* being hyperlinked to take users to the desired SOP

Watch for future enhancements!

SECRETARY'S SAFETY MESSAGE

The North Carolina Department of Transportation has embarked upon the Transportation 2001 plan to fine tune, redirect and expand the scope of transportation priorities in North Carolina. This comprehensive plan addresses the transportation needs of the entire state.

An important component of this transportation plan is ensuring the health and safety of our employees during the implementation and fulfillment of this plan. The skills, talents and experience of our employees are immeasurable. Therefore, the Department understands the benefits in providing a safe and healthful working environment.

We are pleased at the progress that has been made in reducing accidents and injuries in the workplace. However, we will not be satisfied until all employees realize safe and healthful working conditions in the performance of their job duties.

Developing and maintaining a safety culture requires ongoing line management and employee involvement in safety. Managers must continue to make safety number one by promoting programs that are effective in identifying and reducing hazards in the workplace, training our employees to work safely, and by making safety the primary consideration in all operations. Everyone who is in a position to supervise the work of others is responsible and will be held accountable for the safety of their employees.

Individual employees are expected to perform their duties in a safe and responsible manner. You, as an employee, should be alert at all times to your surroundings and fellow workers. Working safely is a condition of employment. The N.C. Department of Transportation believes that "all accidents and injuries are preventable," and we believe your help and cooperation can make this department a safer place to work.



Garland Garrett Jr.

Garland Garrett Jr., Secretary
N.C. Department of Transportation

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

SAFETY PHILOSOPHY

1. All accidents and injuries can be prevented.
2. Management/supervisors are responsible, and will be held accountable, for preventing injuries and occupational illnesses.
3. Occupational safety and health is part of every employee's total job performance.
4. Working safely is a condition of employment.
5. All workplace hazards can be safeguarded.
6. Training employees to work safely is essential and is the responsibility of management/supervision.
7. Prevention of personal injuries and accidents is good business.

DEPARTMENTAL GOALS

SHORT TERM GOALS

(0 - 1 YEAR)

1. Develop safety standards
2. Develop continuing safety training
3. Develop a continuous resource commitment
4. Keep up with Research & Development safety efforts
5. Equipment acquisition to enhance safety
6. Safety modification of equipment
7. Safeguard and prioritize hazards
8. Comprehensive structured program
9. Formalize training program
10. Make necessary changes in personnel system
11. Establish limited incentive/reward program
12. Reorganize safety unit
13. Improve off-the-job safety
14. Change operating procedures with safety in mind
15. Reduce accident and injury rates by 20%
16. Reduce Worker's Compensation by 20%
17. Increase employee safety awareness

INTERMEDIATE GOALS

(1 - 3 YEARS)

1. Instill a safety attitude
2. Total line supervisor commitment
3. Develop safety standards and procedures
4. Develop continuing safety training
5. Keep up with Research and Development safety efforts
6. Equipment acquisition to enhance safety
7. Safety modification of equipment
8. Safeguard hazards
9. Make necessary changes in personnel system
10. Improve off-the-job safety
11. Reduce accident and injury rates by 50%
 - a) Accidents: number and costs
 - b) Lost work days, incidence rate
12. Reduce Worker's Compensation claims by 50%

LONG TERM GOALS

(4 YEARS +)

1. Zero accidents and zero injuries
2. Develop continuing safety training
3. Develop a continuous resource commitment
4. Keep up with research and development safety efforts
5. More equipment acquisition to enhance safety
6. Safety modification of equipment
7. Safeguard hazards
8. Eliminate Worker's Compensation expenditures
9. Establish a complete incentive/reward program
10. Instill a safety climate



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

POLICY NO. 7500	SUBJECT Occupational Safety and Health			
PREPARED BY Department of Transportation	APPROVED BY Bd. of Transportation Secretary of Transp.	DISTRIBUTION A	EFFECTIVE/DATE 9/5/75	PAGE 1 OF 1 PAGES

I. POLICY:

It is hereby declared that the North Carolina Department of Transportation fully subscribes to General Statute 95, Article 16, known as the Occupational Safety and Health Act of North Carolina.

It is further declared that the Department of Transportation through the exercise of its powers shall assure so far as possible every employee in the Department safe and healthful working conditions as provided in the Act.

The rights and duties of employers and employees as described in the Act shall henceforth become a part of the rules and regulations of this Department.

It is further declared that this Department of Transportation will pursue a vigorous and diligent effort to achieve full compliance with the Act and will commit such resources as required to fully perform the responsibilities assigned to State Agencies as described in the Act.

Employees are hereby guaranteed the exercise of their rights under the Occupational Safety and Health Act without being subjected to any retaliation whatsoever. These rights include the right to register complaints about unsafe working conditions; the right to be fully informed about disposition of complaints; and the right to be fully advised about violations of safety standards. These rights also include the right to participate in the safety program and to be represented at safety inspections.

II. SUPERVISOR RESPONSIBILITY:

It shall be the basic responsibility of each supervisor to plan and conduct safe operations. It shall be the duty and responsibility of each supervisor to fully orient and instruct all employees in safe practices and procedures. Supervisors shall immediately take necessary corrective action to prevent reoccurrence or initiate such action as deemed necessary to correct any unsafe act or condition reported or observed.

III. EMPLOYEE RESPONSIBILITY:

It shall be the responsibility of each employee to abide by all Department rules and regulations and to comply with all laws pertaining to employee safety and health. Unsafe acts or conditions observed by any employee shall be reported immediately to the responsible supervisor.

IV. CONTRACTING AGENCY RESPONSIBILITY:

It shall be the policy for all owner-contracting agencies within the Department of Transportation to cooperate fully with State and Federal Agencies to assure contractor compliance with the Occupational Safety and Health Act, alert these agencies of any observed serious violations, and to utilize such sanctions as are consistent with contract terms in assisting the responsible agency in enforcing laws, rules, and regulations.

CARDINAL RULES

These offenses may be grounds for dismissal:

- Failure to report all incidents (accidents, injuries and near misses) immediately
- Possession or use of illicit drugs or alcohol
- Possession of firearms
- Malicious destruction of NCDOT property
- Fighting or horseplay
- Falsification of NCDOT safety documents

Chapter 1

Introduction to the Program

In order to have an effective safety program and reduce accidents and occupational illnesses, each person must be responsible for safety. All line managers and supervisors are expected to take an active role in safety. This involvement by management shows concern for our employees' well-being. Employees are encouraged to report any safety and health problems without fear of retaliation by management.

Management involvement will be accomplished through the structured program established herein. This program will consist of safety committees made up of top management, safety meetings, audits and incident investigations throughout all levels of the organization.

A generic program has been established for the Secretary and the immediate staff, Personnel, Aviation, Civil Rights, Public Transportation, Bicycle, all units reporting to both Assistant Secretaries, Public Affairs, the Governor's Highway Safety Program and all office-related sections of the Division of Motor Vehicles. Within the Division of Highways, this program will be used by all units reporting to the Chief Engineer for Programs and the office oriented units under the Chief Engineer for Preconstruction.

Division of Highways Operations groups, field units of Preconstruction, Division of Motor Vehicles and the Ferry Division have unique safety concerns that are not addressed in the generic program; therefore, specific programs have been developed for these units.

Chapter 2

Generic Program

A) Safety Committees

The safety committees will consist of line organization personnel with Safety and Loss Control acting as a support organization. Each committee will be comprised of top managers in a section and will refer findings up the committee structure. Each committee will be responsible for:

1. Originating, modifying, coordinating and guiding the safety program.
2. Approving safety policies.
3. Exchanging safety information on a section-wide basis.
4. Reviewing trends in their area.

All groups within the department will be expected to utilize the committee meeting structure (See Chart 1). A sample agenda is provided in this document to aid the committees (Figure 1).

DOCUMENTATION: Minutes for all committee meetings should be kept and copies should be sent to Safety and Loss Control and the next higher level committee for review and appropriate action.

Figure 1: Sample Agenda

- I. Opening Remarks
- II. Accident and Injury Status Report
- III. Old Business
- IV. Subcommittees' Reports
- V. New Business
- VI. Safety Awards

Secretary's Safety Steering Committee

(See Chart 1)

This committee will have final approval of all changes in policy. It will be chaired by the Secretary and consist of the Director of Safety and Loss Control, both Deputy Secretaries, the Commissioner of the Division of Motor Vehicles, the State Highway Administrator and the Director of the Governor's Highway Safety Program. It is recommended that the Secretary's Safety Committee meet once per quarter or bimonthly as scheduling allows. This committee will send copies of minutes to Safety and Loss Control only.

State Highway Administrator's Safety Committee

(See Chart 1)

The Administrator's committee will consist of a member of the Administrator's immediate staff, the Chief Engineers and the Secondary Roads Officer. The committee should meet once per month.

Commissioner's Safety Committee

(See Chart 1)

The Commissioner's committee, chaired by the Commissioner, will include the Deputy Commissioner, a member of the Commissioner's staff, the Assistant Commissioners, and all Directors. This committee will meet monthly.

Preconstruction Safety Committee Programs Safety Committee

(See Chart 1)

The Chief Engineer–Preconstruction and the Chief Engineer–Programs will chair their respective committees. Both committees will consist of the appropriate Branch Managers and meet once a quarter or bimonthly as scheduling allows.

Branch Safety Committee

(See Chart 2)

All Branch Managers will hold committee meetings with their respective unit heads.

B) Subcommittees

To aid the safety committees, a system of subcommittees will be established. These subcommittees will be chaired by committee members and made up of volunteers from the work units. These committees may or may not meet on a regular basis, depending upon need. Subcommittee meetings would occur just prior to full committee meetings. The following is a list of these subcommittees:

- 1) **Incident and Injury Investigation**
Review incident investigations, statistics and trends and monitor compliance with recommendations.
- 2) **Audit Review**
Review audit reports, compile and analyze data and make periodic safety and housekeeping inspections.
- 3) **Safety Programs or Special Activities**
Develop safety programs, safety awards and incentive programs and guide subordinate units' efforts.
- 4) **Off-the-Job Safety**
Plan, develop and promote material for off-the-job safety programs.
- 5) **Policy and Procedures Review**
Periodically review policies, procedures, rules and operations to ensure that all necessary safety precautions are being taken.
- 6) **New Equipment Acceptance**
Inspect new equipment and facilities to ensure that all safeguards have been provided.

DOCUMENTATION: Subcommittees will keep minutes and report to their respective committees.

C) Safety Meetings

Safety meetings are very useful ways of training our employees and they are a vital part of the Department's safety atmosphere. Safety meetings should be used to present information, discuss problems and new ideas and discuss recent accidents and injuries. These meetings can vary greatly in length but should be held on a regular schedule to keep safety on the employees' minds. A meeting planner is attached to aid supervisors in planning for and conducting their meetings (See Form M-1).

Safety meetings involve employees in the safety program. They can conduct meetings, report on special projects and lead group discussions. All employees are required to attend safety meetings.

DOCUMENTATION: Only monthly meetings will be recorded (See Form M-2). One copy of this form should be forwarded to the lowest safety committee responsible for that unit. Weekly and daily meetings will not be documented; however, a checklist is enclosed for reference (See Form M-3).

Staff Safety Meetings

(See Chart 2)

Staff safety meetings will be conducted by all Department of Transportation supervisors with their direct subordinates. These employees will then hold meetings with their subordinates, continuing the process until every employee within NCDOT has been involved in a safety meeting. This type of layered system will require supervisors to attend a safety meeting and then relay information through subordinates in their respective safety meetings.

D) Auditing

Auditing is an important key to improved safety performance. Auditing identifies unsafe acts and practices before an injury takes place. Audits should be both announced and unannounced.

When used properly, auditing can:

- 1) Maintain standards by ensuring that employees follow NCDOT rules and procedures.
- 2) Identify where rules or procedures are insufficient.
- 3) Measure the effect of safety education.
- 4) Reveal weaknesses in the safety program.
- 5) Motivate employees by showing the results of their safety efforts.
- 6) Increase safety awareness.

Supervisors will be responsible for auditing. New supervisors will be trained in the methods of auditing by being shown sample conditions and practicing audits (See Form R-1).

DOCUMENTATION: Completed audit forms should be submitted to the next level of management and to the lowest Audit Review Subcommittee responsible for that unit.

Office Environment Audits

Many of the Department's employees work in office environments. These areas will not need the frequent audits that the field units will require.

These offices should perform a formal announced audit semi-annually. Intermediate audits would be performed at the discretion of the supervisor.

E) Incident Investigation

An incident is an event that could have, or did, result in personal injury or damage to state or private property. **Investigations of these incidents are important for the prevention of future accidents and tracking the quality of our safety program.** Incident investigations will not be a fault-finding process. Once an incident has occurred, it is important to prevent it from happening again.

As soon as possible following a reported incident, the unit supervisor will assemble an incident investigation team. The team will always include the unit supervisor, the immediate supervisor and a peer of the employee(s)

involved. Additional management, technical and safety support staff and the involved employee(s) should be included as needed. There should be a rotation for the selection of the peer for the teams.

Inclusion of the employee(s) involved generally improves the response of other employees to the team's recommendations and can be a valuable resource in discovering vital underlying facts.

The results of the investigation should be communicated to the employees and other supervisors to prevent recurrence of this incident in other groups.

Investigation reports should be reviewed by the Incident and Injury Investigation Subcommittee responsible for that unit. The first line supervisor is responsible for ensuring that the recommendations are implemented. The subcommittees will certify that corrective actions have been taken and documentation is consistent.

DOCUMENTATION:

- 1) Employees will report the incident to the supervisors immediately.
- 2) Employees will complete the Employee's Statement Form I-1 and shall return it to their supervisor within one day of the incident. The supervisor shall forward a copy of Form I-1 to Safety and Loss Control within two days of the incident. If a piece of equipment was involved, a Form 140 will also be completed and a copy forwarded to Safety and Loss Control within two days.
- 3) If an injury has resulted, the immediate supervisor will complete the North Carolina Industrial Commission Form 19 and **send within one day from the date of the knowledge of the injury the original and one copy of Form 19 to NCDOT's Workers' Compensation Unit** and one copy to each of the following:
 - The injured employee
 - Safety and Loss Control
 - Division/Unit Safety Officer

(NC Industrial Commission requires a Form 19 within five days of the date of the knowledge of the injury.)

- 4) Provide the injured worker the following:
 - Employee Statement Form (Form I-1)
 - NCDOT Medical Authorization/Return to Work Form
 - NCDOT Work Ability Evaluation Form
 - Leave Option Form (Form FR-26)
 - Copy of the most recent Workers' Compensation informational brochure
- 5) As soon as possible following a reported incident, an incident investigation team will review all documentation and complete Parts I, II and IV of the Incident Investigation Summary Form I-2.
- 6) All documentation (Forms 19, I-1, I-2 and 140, and previous accident history) will be compiled and forwarded to the Incident and Injury Investigation Subcommittee at the time of completion.
- 7) The Safety Officer and/or Investigating Supervisor will review the incident documentation, determine what corrective actions have been taken and make a report to the Incident and Injury Investigation Subcommittee.
- 8) The Subcommittee will review all data and complete Part III of the Incident Investigation Form I-2 and forward a copy of Form I-2 to Safety and Loss Control.
- 9) The Subcommittee will compile trends in their area and make a report at the regularly scheduled full Committee safety meeting. (See section A of this chapter for full Committee safety meeting frequencies.)

Note: Forms are included in Chapter 7.

Chapter 3

Division of Highways – Operations

A) Safety Committees

The safety committees will consist of line organization personnel with Safety and Loss Control acting as a support organization. Each committee will be comprised of top managers in a section and will refer findings up the committee structure. Each committee will be responsible for:

1. Originating, modifying, coordinating and guiding the safety program.
2. Approving safety policies.
3. Exchanging safety information on a section-wide basis.
4. Reviewing trends in their area.

All groups within the department will be expected to utilize the committee meeting structure. A sample agenda is provided in this document to aid the committees (Figure 1).

DOCUMENTATION: Minutes for all committee meetings should be kept and copies should be sent to Safety and Loss Control and the next higher level committee for review and appropriate action.

Monthly committee meetings and monthly safety meetings are documented on Form M-2. Copies of these reports are included in the quarterly Unit Report which is submitted to the Branch Manager.

Figure 1: Sample Agenda

- I. Opening Remarks
- II. Accident and Injury Status Report
- III. Old Business
- IV. Subcommittees' Reports
- V. New Business
- VI. Safety Awards

Operations Safety Committee

(See Chart 1)

This committee will be chaired by the Chief Engineer–Operations and will include the Chief Engineer's staff, Branch Managers, Division Engineers, Unit Heads and the Manager of Safety and Loss Control. This committee will meet monthly in conjunction with the Operations staff meeting.

All subcommittee functions will be handled by the Standing Operations Advisory Committee. This committee meets monthly in conjunction with the Operations staff meeting.

Construction and Materials Branch Safety Committee

(See Chart 2)

The Branch Manager chairs this committee consisting of the State Construction Engineer, the State Materials Engineer and the State Roadside Environmental Engineer. This committee will meet quarterly.

Maintenance and Equipment Branch Safety Committee

(See Chart 2)

The Branch Manager chairs this committee consisting of the State Road Maintenance Engineer, the State Bridge Maintenance Engineer and the Director of Equipment and Inventory Control. This committee will meet quarterly.

Division Engineer's Safety Committee

(See Chart 3)

This committee will be chaired by the Division Engineer and will include the Division Construction Engineer, the Division Maintenance Engineer and the Division Operations Engineer. They will meet on a monthly basis and will have the Division Safety Specialist staffed to them. Elements of other statewide operating units may attend the committee meetings as appropriate.

Materials and Tests Safety Committee

(See Chart 4)

The Unit will have its own safety committee chaired by the State Materials Engineer. The Committee's members will include the Assistant State Materials Engineer, Central Laboratory Heads, Materials Operations Engineer, the Head of Independent Assurance and the Structural Members Engineer. This committee will meet monthly.

Bridge Inspection Safety Committee

(See Chart 5)

This committee will be chaired by the Bridge Inspection Engineer and its members will include the Assistant Bridge Inspection Engineer, the Bridge Inspection Superintendent and each of the Bridge Inspection Supervisors. This committee will meet monthly.

Equipment and Inventory Control Safety Committee

(See Chart 6)

This committee will be chaired by the Director of the Equipment and Inventory Control Unit, and will consist of the Area Equipment Superintendents, the Assistant Director of Equipment and Inventory Control, the Equipment Engineer, the Inventory Control Manager and the Equipment Depot Superintendent. This committee will meet monthly.

In addition to any Department-wide subcommittees, the following subcommittees will also be used:

- a) **Equipment Specifications Safety Review**
This subcommittee, chaired by the Assistant Unit Director, will be comprised of the Area Equipment Superintendents. This group will review equipment specifications for safety.
- b) **Industrial Facility Safety**
This subcommittee will be chaired by the Inventory Control Manager. Its members will include the Equipment Engineer, the Area Equipment Superintendents and the Depot Superintendent. This group will review audits and incident investigations for industrial facility activities.

- c) **Office Work Safety, Personal and Driver Safety**

This subcommittee will be chaired by the Equipment Engineer and will include the Inventory Control Manager and Depot Superintendent. This group will review audits and incident investigations for Equipment and Inventory Control administrative activities. These groups will meet as needed to serve the Safety Committee.

B) Subcommittees

To aid the safety committees, a system of subcommittees will be established. These subcommittees will be chaired by committee members and made up of volunteers from the work units. These subcommittees may or may not meet on a regular basis, depending upon need. Subcommittee meetings would occur just prior to full committee meetings. The following is a list of these subcommittees:

- 1) **Incident and Injury Investigation**
Reviews incident investigations, statistics and trends and monitors compliance with recommendations.
- 2) **Audit Review**
Reviews audit reports, compiles and analyzes data and makes periodic safety and housekeeping inspections.
- 3) **Safety Programs or Special Activities**
Develops safety programs, safety awards and incentive programs and guides subordinate unit's efforts.
- 4) **Off-the-Job Safety**
Plans, develops and promotes material for off-the-job safety programs.
- 5) **Policy and Procedures Review**
Periodically reviews policies, procedures, rules and operations to ensure that all necessary safety precautions are being taken.
- 6) **New Equipment Acceptance**
Inspects new equipment and facilities to ensure that all safeguards have been provided.

Subcommittees will keep minutes and report to their respective committees.

C) Safety Meetings

Safety meetings are very useful ways of training our employees and they are a vital part of the Department's safety atmosphere. Safety meetings should be used to present information, discuss problems and new ideas and discuss recent accidents and injuries. These meetings can vary greatly in length but should be held on a regular schedule to keep safety on the employees' minds. A meeting planner is attached to aid supervisors in planning for and conducting their meetings (See Form M-1).

Safety meetings involve employees in the safety program. They can conduct meetings, report on special projects and lead group discussions. All employees are required to attend safety meetings.

DOCUMENTATION: Only monthly meetings will be recorded (See Form M-2). One copy of this form should be forwarded to the lowest safety committee responsible for that unit. Weekly and daily meetings will not be documented; however, a checklist is enclosed for reference (See Form M-3).

Division Construction Engineer's Meeting

Division Maintenance Engineer's Meeting

Division Operations Engineer's Meeting

(See Chart 3)

Each will meet with their direct subordinates on a monthly basis to conduct a formal safety meeting in addition to evaluating accidents and discussing methods of improving safety.

It should be noted that Locations and Surveys Locating Engineers may attend the Division Construction Engineer's Meeting.

Resident Engineer's Meetings

(See Chart 3)

- 1) Resident Engineers will hold monthly safety meetings with the Assistant Resident Engineers as well as a monthly meeting

with the entire office. The meeting with the Assistant Resident Engineers should be used to discuss ways of improving public and contractor's safety in work zones as well as to plan the office safety meeting. It is suggested that this meeting take place just prior to the office safety meeting. The office safety meeting will be documented.

- 2) Assistant Resident Engineers will meet weekly with Project Inspectors and Survey Party Chiefs under their direction to evaluate the safety measures in place and any unsafe conditions. The frequency of the meetings may be varied depending on the type of projects and their complexity. Meetings should be held on the projects.
- 3) Project Inspectors and Survey Party Chiefs should have daily "tailgate" safety meetings with their subordinates to discuss daily activities with regards to safety.

District Engineer's Meetings

(See Chart 3)

- 1) District Engineers will hold monthly meetings with all staff reporting directly to them.
- 2) Highway Maintenance Engineers will hold a monthly meeting for Road Maintenance Supervisors to discuss crew activities, incident investigations and plan the County Maintenance Yard safety meeting. The Highway Maintenance Engineer will also conduct a monthly County Maintenance Yard safety meeting. The County Yard meeting must be documented.
- 3) Road Maintenance Supervisors will meet weekly with their crew leaders on their projects to evaluate the safety measures in place and any unsafe conditions.
- 4) Crew Leaders should hold daily "tailgate" safety meetings to discuss the plans for the day and insure that all safety devices needed are on board.

Division Traffic Engineer's Meetings

(See Chart 3)

- 1) Division Traffic Engineers will hold monthly meetings with all staff reporting directly to them.

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- 2) Traffic Services Supervisors will hold monthly safety meetings for everyone in their shop and weekly meetings with their crew leaders to discuss safety measures and incident investigations. Any personnel unable to attend this meeting will attend a County Maintenance Yard's monthly safety meeting.
 - 3) Crew Leaders should hold daily "tailgate" safety meetings to discuss the plans for the day and insure that all safety devices are on board.

Division Roadside Environmental Engineer's Meetings

(See Chart 3)

- 1) The Division Roadside Environmental Engineers will hold a monthly safety meeting with all personnel reporting directly to them. Any personnel unable to attend this meeting will attend a County Maintenance Yard's monthly safety meeting.
- 2) Division Roadside Environmental Engineer will hold weekly meetings with the Landscape Specialists to discuss safety measures and accident reports.
- 3) Landscape Specialists should hold daily "tailgate" safety meetings with their crews to discuss the plans for the day and insure that all safety devices are on board.

Division Bituminous Engineer's Meetings

(See Chart 3)

- 1) The Division Bituminous Engineers will hold a monthly safety meeting with all personnel reporting directly to them. Any personnel unable to attend this meeting will attend a County Maintenance Yard's monthly safety meeting.
- 2) Division Bituminous Engineers will hold weekly meetings with Crew Leaders to discuss safety measures and accident reports.
- 3) Crew Leaders should hold daily "tailgate" safety meetings with their crews to discuss the plans for the day and insure that all safety devices are on board.

Division Equipment Superintendent's Meetings

(See Chart 3)

- 1) Each equipment shop will hold a monthly safety meeting. Personnel will attend the County Maintenance Yard's meeting in those sub-shops where it would not be appropriate to have an individual meeting.
- 2) The Equipment Superintendent will hold a monthly meeting with Equipment Supervisors.
- 3) Mechanic Supervisors and Parts Supervisors will have daily "tailgate" meetings with their personnel.

Departmental Area Engineers

Area Engineers will have semi-annual safety meetings with their direct supervisors. They will plan to attend group safety meetings within their assigned Divisions bimonthly.

Materials and Tests Central and Regional Laboratories Safety Meetings

(See Chart 4)

Each of the four Raleigh laboratories and all regional laboratories will conduct organized safety meetings monthly. They will also hold a short weekly session to discuss any safety items that may have developed .

Materials Operations Engineer, Independent Assurance and Structural Members Engineer

(See Chart 4)

The supervisors in these groups will have a monthly safety contact with all employees in their organizations. This contact may be a group meeting or an individual contact by the supervisor.

Field Operations Engineer, Section Materials Specialist

The Field Operations Engineer and the Section Materials Specialist will conduct one organized safety meeting per month with employees under their direct supervision.

Bridge Maintenance Inspection Safety Meetings

(See Chart 5)

Each group will hold an organized monthly safety meeting to discuss safety concerns and incident investigations.

Bridge Maintenance Operations Safety Meetings

(See Chart 5)

- 1) Bridge Maintenance Superintendents will meet monthly with their Bridge Maintenance Supervisors.
- 2) Bridge Maintenance Supervisors will meet monthly with their crews.
- 3) Bridge Maintenance Supervisor or Bridge Worker III's will hold daily tailgate meetings to discuss plans for the day and ensure that all safety devices are on board.

Bridge Maintenance Electrical Engineering Section

(See Chart 5)

The Electrical Engineering Supervisor will have a monthly individual safety contact with his employees.

Equipment and Inventory Control Administrative Safety Meeting

(See Chart 6)

The Director will conduct a monthly safety meeting for all support staff.

Equipment and Inventory Control Supply Warehouse Safety Meeting

(See Chart 7)

The Parts Inventory Supervisor will conduct a monthly safety meeting for the Supply Warehouse staff.

Inventory Support Safety Meeting Equipment Depot Support Safety Meeting

(See Chart 8)

Monthly meetings will be conducted by the Supervisors for both groups.

Equipment Shop Safety Meetings

(See Chart 8)

Each shop will conduct an individual safety meeting monthly for its employees. Apprentices will attend safety meetings in their assigned shops.

D) Auditing

Auditing is an important key to improved safety performance. Auditing identifies unsafe acts and practices before an injury takes place. Audits should be both announced and unannounced.

When used properly, auditing can:

- 1) Maintain standards by ensuring that employees follow NCDOT rules and procedures.
- 2) Identify where rules or procedures are insufficient.
- 3) Measure the effect of safety education.
- 4) Reveal weaknesses in the safety program.
- 5) Motivate employees by showing the results of their safety efforts.
- 6) Increase safety awareness.

Supervisors will be responsible for auditing. New supervisors will be trained in the methods of auditing by being shown sample conditions and practicing audits (See Form R-1).

DOCUMENTATION: Completed audit forms should be submitted to the next level of management and to the lowest Audit Review Subcommittee responsible for that unit.

Office Environment Audits

Many of the Department's employees work in office environments. These areas will not need the frequent audits that the field units will require.

These offices should perform a formal announced audit semi-annually. Intermediate audits would be performed at the discretion of the supervisor.

Chief Engineer–Operations

The Chief Engineer–Operations will audit one operation in each division each year. This audit will be announced to the Division Engineer. Additional audits may be conducted but need not be announced.

Construction and Materials Branch Manager Maintenance and Equipment Branch Manager

Branch Managers will audit each unit annually. These audits should be announced.

Division Engineer

(See Chart 9)

The Division Engineer will audit each of the following, on a yearly basis. These audits should be both announced and unannounced.

A) Resident Engineers

The Division Engineer will audit one active project in each Resident Engineer's office. These audits will involve reviewing project inspection personnel and survey party crews. The Resident Engineer should accompany the Division Engineer.

B) District Engineers

The Division Engineer will audit an operation or a maintenance facility in each district. The District Engineer, the Highway Maintenance Engineer and the Division Maintenance Engineer may accompany the Division Engineer.

C) Equipment

The Division Engineer will audit one Equipment Shop each year. The Equipment Superintendent should accompany the Division Engineer.

D) Division Bituminous Section, Roadside Environmental Section and Traffic Services

The Division Engineer will audit each of these groups individually. These audits may be of a facility or an operation. The Division Engineer should be accompanied by the manager of each section.

Division Construction Engineer Division Maintenance Engineer Division Operations Engineer

(See Chart 9)

These individuals will conduct audits of all the offices reporting to them on a quarterly basis and should be primarily operations reviews .

Resident Engineer

(See Chart 9)

The Resident Engineer will audit two active projects each month and each facility quarterly. The frequency of project audits may be varied depending on the types of projects and their complexity.

Assistant Resident Engineer

(See Chart 9)

Assistant Resident Engineers will audit two active projects each month. Project reviews will include traffic control, contractor operations and employee activities. The frequency of project audits may be varied depending on the types of projects and their complexity.

District and Assistant District Engineers

(See Chart 9)

The District and Assistant District Engineers will jointly audit a force account construction or a maintenance operation every month. They will also audit one maintenance yard each quarter. The Highway Maintenance Engineer may accompany them.

Highway Maintenance Engineer

(See Chart 9)

Highway Maintenance Engineers, along with the respective Road Maintenance Supervisor, will audit crew operations. They will audit two crews per month. Audits of the Maintenance Yard will also be conducted on a quarterly basis.

Division Bituminous Engineer
Roadside Environmental Engineer
Division Traffic Engineer
(See Chart 9)

These individuals, along with their immediate subordinates, will audit at least one facility a quarter with all facilities being audited each year. They will also audit one crew each month.

Equipment Superintendents

Equipment Superintendents will audit one sub-shop per month.

State Materials Engineer
Assistant State Materials Engineer

These individuals will conduct announced audits of the four central labs yearly. They will also conduct eight yearly audits of the other field operations on a random basis.

Materials and Tests Central and Regional Laboratories

The Laboratory Supervisors will audit their laboratories quarterly. It is suggested that Laboratory Supervisors conduct their audits with another Laboratory Supervisor.

Materials Operations Engineer
Independent Assurance
Structural Members Engineer

These individuals will audit each function that reports to them on a quarterly basis. These audits should be performed randomly.

Section Materials Specialist

The Laboratory Supervisors will audit a function that reports to them each month.

Field Operations Engineer

Research and Investigations Engineer will audit the functions that report to their respective departments on a quarterly basis.

State Bridge Maintenance Engineer
Assistant State Bridge Maintenance Engineer

These individuals will audit all bridge maintenance yards yearly.

Bridge Maintenance Superintendent

Bridge Maintenance Superintendents will audit their yards quarterly. Also, in conjunction with the Bridge Maintenance Supervisors, they will audit two crews per month.

Electrical Engineering Supervisor

The Electrical Engineering Supervisor will audit each employee quarterly.

Director of Equipment and Inventory Control and/or Assistant Director of Equipment and Inventory Control

These individuals will audit the Depot Shops with the Depot Superintendents two times per year. They will also audit the warehouse area two times per year. The Inventory Control Manager will accompany them on these audits.

Depot Superintendent

The Depot Superintendent, in conjunction with the Shop Supervisors, will audit each shop quarterly.

Area Equipment Superintendents

The Area Equipment Superintendents will audit one shop in each division quarterly.

E) Incident Investigation

An incident is an event that could have, or did, result in personal injury or damage to state or private property. **Investigations of these incidents are important for the prevention of future accidents and tracking the quality of our safety program.** Incident investigations will not be a fault-finding process. Once an incident has occurred, it is important to prevent it from happening again.

As soon as possible following a reported incident, the unit supervisor will assemble an incident investigation team. The team will always include the unit supervisor, the immediate supervisor and a peer of the employee(s) involved. Additional management, technical and safety support staff and the involved employee(s)

should be included as needed. There should be a rotation for the selection of the peer for the teams.

Inclusion of the employee(s) involved generally improves the response of other employees to the team's recommendations and can be a valuable resource in discovering vital underlying facts.

The results of the investigation should be communicated to the employees and other supervisors to prevent recurrence of this incident in other groups.

Investigation reports should be reviewed by the Incident and Injury Investigation Subcommittee responsible for that unit. The first line supervisor is responsible for ensuring that the recommendations are implemented. The subcommittees will certify that corrective actions have been taken and documentation is consistent.

DOCUMENTATION:

- 1) Employees will report the incident to the supervisors immediately.
- 2) Employees will complete the Employee's Statement Form I-1 and shall return it to their supervisor within one day of the incident. The supervisor shall forward a copy of Form I-1 to Safety and Loss Control within two days of the incident. If a piece of equipment was involved, a Form 140 will also be completed and a copy forwarded to Safety and Loss Control within two days.
- 3) If an injury has resulted, the immediate supervisor will complete the North Carolina Industrial Commission Form 19 and **send within one day from the date of the knowledge of the injury the original and one copy of Form 19 to NCDOT's Workers' Compensation Unit** and one copy to each of the following:
 - The injured employee
 - Safety and Loss Control
 - Division/Unit Safety Officer

(NC Industrial Commission requires a Form 19 within five days of the date of the knowledge of the injury.)

- 4) Provide the injured worker the following:
 - Employee Statement Form (Form I-1)
 - NCDOT Medical Authorization/Return to Work Form
 - NCDOT Work Ability Evaluation Form
 - Leave Option Form (Form FR-26)
 - Copy of the most recent Workers' Compensation informational brochure
- 5) As soon as possible following a reported incident, an incident investigation team will review all documentation and complete Parts I, II and IV of the Incident Investigation Summary Form I-2.
- 6) All documentation (Forms 19, I-1, I-2 and 140, and previous accident history) will be compiled and forwarded to the Incident and Injury Investigation Subcommittee at the time of completion.
- 7) The Safety Officer and/or Investigating Supervisor will review the incident documentation, determine what corrective actions have been taken and make a report to the Incident and Injury Investigation Subcommittee.
- 8) The Subcommittee will review all data and complete Part III of the Incident Investigation Form I-2 and forward a copy of Form I-2 to Safety and Loss Control.
- 9) The Subcommittee will compile trends in their area and make a report at the regularly scheduled full Committee safety meeting. (See Section A of this chapter for full Committee safety meeting frequencies.)

Note: Forms are included in Chapter 7.

Chapter 4

Division of Highways – Preconstruction (Field Operations)

A) Safety Committees

The safety committees will consist of line organization personnel with Safety and Loss Control acting as a support organization. Each committee will be comprised of top managers in a section and will refer findings up the committee structure. Each committee will be responsible for:

1. Originating, modifying, coordinating and guiding the safety program.
2. Approving safety policies.
3. Exchanging safety information on a section-wide basis.
4. Reviewing trends in their area.

All groups within the department will be expected to utilize the committee meeting structure (See Chart 1). A sample agenda is provided in this document to aid the committees (Figure 1).

DOCUMENTATION: Minutes for all committee meetings should be kept and copies should be sent to Safety and Loss Control and the next higher level committee for review and appropriate action.

Monthly committee meetings and monthly safety meetings are documented on Form M-2. Copies of these reports are included in the quarterly Unit Report which is submitted to the Branch Manager.

Figure 1: Sample Agenda

- I. Opening Remarks
- II. Accident and Injury Status Report
- III. Old Business
- IV. Subcommittees' Reports
- V. New Business
- VI. Safety Awards

Location and Surveys Safety Committee

(See Chart 10)

The State Location and Surveys Engineer will chair the quarterly safety committee. Its members will include Assistant Unit Heads and Area Locating Engineers.

Highway Design Branch Committee

(See Chart 20)

The State Highway Design Engineer will chair the quarterly safety committee. Its members will include the Design Branch Unit Heads, the Branch Staff Engineer and the Administrative Assistant.

Hydraulics Safety Committee

(See Chart 21)

The State Hydraulics Engineer will chair the monthly safety committee. Its members will include the Assistant State Hydraulics Engineer, the Special Studies Manager, the Maintenance Studies Manager and the Project Managers. The committee will meet for the purpose of presenting information, discussing problems and new ideas, and reviewing incident reports.

Photogrammetry Safety Committee

(See Chart 22)

The State Photogrammetric Engineer will chair his safety committee monthly. Its members will include the Assistant State Photogrammetric Engineer, Photogrammetric Engineering Supervisors, Photo Lab Supervisor, Transportation Staff Engineer and the Administrative Assistant.

Structure Design Safety Committee

(See Chart 23)

The State Bridge Design Engineer will chair a monthly committee whose members will include the Assistant State Bridge Maintenance Engineers, the Administrative Assistant and the Project Engineers.

Design Services Safety Committee

(See Chart 24)

The State Design Services Engineer will chair a quarterly safety committee. Its members will include all managers reporting directly to him as well as the staff engineer.

Geotechnical Safety Committee

(See Chart 25)

The State Transportation Engineering Geologist will chair a quarterly safety committee. Its members will include all Transportation Engineering Geologists Supervisors, the Environmental Engineering Geologists Supervisors, the Environmental Engineering Geologist Supervisor and the Consultant Engineering Geologist Supervisor.

Roadway Design Safety Committee

(See Chart 26)

The Roadway Design Engineer will chair a monthly safety committee. Its members will include all Project Engineers and the Safety Coordinator.

Right of Way Branch Safety Committee

(See Chart 27)

The Right of Way Branch Manager will chair the quarterly safety committee. The committee will meet once a quarter by the 30th day of the third month and the committee members will include the Assistant Branch Managers, Unit Heads, Right of Way Consultant Coordinator and Right of Way Training and Policy Administrator. This meeting, at the discretion of the Branch Manager, may also include all Branch Supervisory Personnel.

B) Subcommittees

To aid the safety committees, a system of subcommittees will be established. These subcommittees will be chaired by committee members and made up of volunteers from the work units. These committees may or may not meet on a regular basis, depending upon need.

Subcommittee meetings would occur just prior to full committee meetings. The following is a list of these subcommittees:

- 1) **Incident and Injury Investigation**
Review incident investigations, statistics and trends, and monitor compliance with recommendations.
- 2) **Audit Review**
Review audit reports, compile and analyze data, and make periodic safety and housekeeping inspections.
- 3) **Safety Programs or Special Activities**
Develop safety programs, safety awards and incentive programs, and guide subordinate units' efforts.
- 4) **Off-the-Job Safety**
Plan, develop and promote material for off-the-job safety programs.
- 5) **Policy and Procedures Review**
Periodically review policies, procedures, rules and operations to ensure that all necessary safety precautions are being taken.
- 6) **New Equipment Acceptance**
Inspect new equipment and facilities to ensure that all safeguards have been provided.

Subcommittees will keep minutes and report to their respective committees.

C) Safety Meetings

Safety meetings are very useful ways of training our employees and they are a vital part of the Department's safety atmosphere. Safety meetings should be used to present information, discuss problems and new ideas and discuss recent accidents and injuries. These meetings can vary greatly in length but should be held on a regular schedule to keep safety on the employees' minds. A meeting planner is attached to aid supervisors in planning for and conducting their meetings (See Form M-1).

Safety meetings involve employees in the safety program. They can conduct meetings, report on special projects and lead group

discussions. All employees are required to attend safety meetings.

DOCUMENTATION: Only monthly meetings will be recorded (See Form M-2). One copy of this form should be forwarded to the lowest safety committee responsible for that unit. Weekly and daily meetings will not be documented; however, a checklist is enclosed for reference (See Form M-3).

Area Locating Engineer's Meeting

(See Chart 10)

The Area Locating Engineers will hold a monthly meeting with their Locating Engineers prior to the group safety meetings. They also will attend the monthly group safety meetings on a rotating basis.

The Area Locating Engineer also will attend Division Safety Committee meetings. They will rotate among the Divisions in their area.

Locating Engineer's Meeting

(See Chart 10)

The Locating Engineers will hold a monthly meeting with all employees reporting to them.

The Locating Engineers will attend the Division Construction Engineer's meeting.

Assistant Locating Engineer's Meeting

(See Chart 10)

The Assistant Locating Engineers will have daily "tailgate" meetings with their crews.

Area Geologist's Meeting

(See Chart 25)

The Area Geologists will hold monthly safety meetings with their staff.

The Area Geologists will attend the Division Safety Committee meeting and may designate one of their staff members to attend a Resident or District Engineer's monthly safety meeting.

Highway Geologist II Meeting

(See Chart 25)

The Highway Geologists II or their assistants will hold daily "tailgate" meetings with their crews.

Highway Design Branch Offices

(See Chart 20)

The Highway Design Branch will hold a quarterly office safety meeting. This meeting will include all members of the branch staff.

Hydraulics Engineering Managers

(See Chart 21)

Engineering Managers will conduct monthly safety meetings for all employees in their respective sections. Information presented at the Hydraulics Safety Committee meeting will be discussed along with any other safety concerns.

Hydraulics Field Personnel

(See Chart 21)

Daily tailgate meetings will be held for all personnel when performing field operations. These meetings, conducted at the beginning of each workday, will include discussions of hazardous tasks which could be involved in the work along with recommended Safe Operating Procedures.

Photogrammetric Engineering Supervisors

(See Chart 22)

The Photogrammetric Engineering Supervisors will hold a monthly meeting with all employees reporting to them.

Photogrammetric Project Engineers

(See Chart 22)

The Photogrammetric Project Engineers will hold a monthly meeting with all Squad Leaders reporting to them.

Photogrammetry Squad Leaders

(See Chart 22)

Squad Leaders will hold a monthly meeting with their employees.

Photo Lab Supervisor

(See Chart 22)

The Photo Lab Supervisor will hold a monthly meeting with all employees in the lab.

Photogrammetry Administrative Assistant

(See Chart 22)

The Administrative Assistant will hold daily meetings with all employees reporting to them.

Structure Design Project Engineers

(See Chart 23)

Structure Design Project Engineers will meet monthly with their employees.

Design Services Safety Meetings

(See Chart 24)

All managers will hold quarterly safety meetings with the employees reporting directly to them. These employees will then hold meetings with their subordinates.

Roadway Design Safety Meetings

(See Chart 26)

All Project Engineers will hold monthly safety meetings with all squad members reporting to them.

Right of Way Monthly Safety Meetings

(See Chart 27)

Area Appraiser, Area Relocation Agents, Division Right of Way Agents, Administrative Squads in Central Office and Utility Agents will meet monthly with their respective offices for a group safety meeting.

D) Auditing

Auditing is an important key to improved safety performance. Auditing identifies unsafe acts and practices before an injury takes place. Audits should be both announced and unannounced.

When used properly, auditing can:

- 1) Maintain standards by ensuring that employees follow NCDOT rules and procedures.
- 2) Identify where rules or procedures are insufficient.
- 3) Measure the effect of safety education.
- 4) Reveal weaknesses in the safety program.
- 5) Motivate employees by showing the results of their safety efforts.
- 6) Increase safety awareness.

Supervisors will be responsible for auditing. New supervisors will be trained in the methods of auditing by being shown sample conditions and practicing audits (See Form R-1).

DOCUMENTATION: Completed audit forms should be submitted to the next level of management and to the lowest Audit Review Subcommittee responsible for that unit.

Office Environment Audits

Many of the Department's employees work in office environments. These areas will not need the frequent audits that the field units will require.

These offices should perform a formal announced audit semi-annually. Intermediate audits would be performed at the discretion of the supervisor.

State Location and Surveys Engineer

Assistant State Location and Surveys Engineer for Statewide Field Operations

Right of Way Unit Heads or Training and Policy Administrator

These individuals will conduct operations audits on each group per year.

Area Locating Engineer

The Area Locating Engineer will audit one group operation each month. They will also audit their facilities twice per year.

Locating Engineer

The Locating Engineer will audit all active projects monthly. They also will audit their facilities monthly.

Assistant Locating Engineer

The Assistant Locating Engineer will audit all active projects monthly.

Geotechnical Audits

- 1) The Geotechnical Crews will audit their operations daily.
- 2) Prior to the monthly safety meeting, a committee, made up of at least one member of each crew, will discuss the audits and report findings at the safety meeting.

Hydraulics Section

Audits for field operations are conducted twice yearly for each work group in the five sections where applicable. (Field operations in the Special Studies Section is very limited. Audits are to be conducted only when it is deemed there is a sufficient amount of field work performed to warrant an audit.) All audits are to be conducted by Engineering Managers.

Office audits are to be conducted yearly by the Assistant Unit Head. Copies of all audit forms are forwarded to the Design Branch Manager with the quarterly Unit Safety Report.

State Photogrammetric Engineer Assistant State Photogrammetric Engineer Transportation Staff Engineer

These individuals will perform operations audits with each group yearly.

Photogrammetric Engineering Supervisors Photo Lab Manager Administrative Assistant

These individuals will audit one group operation and their facilities each month.

Photogrammetric Project Engineers

These individuals will audit one group operation and their facilities each month.

Prior to the monthly safety meeting, a committee, made up of one member from each squad, will discuss the audits and report findings at the safety meeting.

E) Incident Investigation

An incident is an event that could have, or did, result in personal injury or damage to state or private property. **Investigations of these incidents are important for the prevention of future accidents and tracking the quality of our safety program.** Incident investigations will not be a fault-finding process. Once an incident has occurred, it is important to prevent it from happening again.

As soon as possible following a reported incident, the unit supervisor will assemble an incident investigation team. The team will always include the unit supervisor, the immediate supervisor and a peer of the employee(s) involved. Additional management, technical and safety support staff and the involved employee(s) should be included as needed. There should be a rotation for the selection of the peer for the teams.

Inclusion of the employee(s) involved generally improves the response of other employees to the team's recommendations and can be a valuable resource in discovering vital underlying facts.

The results of the investigation should be communicated to the employees and other supervisors to prevent recurrence of this incident in other groups.

Investigation reports should be reviewed by the Incident and Injury Investigation Subcommittee responsible for that unit. The first line supervisor is responsible for ensuring that the recommendations are implemented. The subcommittees will certify that corrective actions have been taken and documentation is consistent.

DOCUMENTATION:

- 1) Employees will report the incident to the supervisors immediately.
- 2) Employees will complete the Employee's Statement Form I-1 and shall return it to their supervisor within one day of the incident. The supervisor shall forward a copy of Form I-1 to Safety and Loss Control within two days of the incident. If a piece of equipment was involved, a Form 140 will also be completed and a copy forwarded to Safety and Loss Control within two days.
- 3) If an injury has resulted, the immediate supervisor will complete the North Carolina Industrial Commission Form 19 and **send**

within one day from the date of the knowledge of the injury the original and one copy of Form 19 to NCDOT's Workers' Compensation Unit and one copy to each of the following:

- The injured employee
- Safety and Loss Control
- Division/Unit Safety Officer

(NC Industrial Commission requires a Form 19 within five days of the date of the knowledge of the injury.)

4) Provide the injured worker the following:

- Employee Statement Form (Form I-1)
- NCDOT Medical Authorization/Return to Work Form
- NCDOT Work Ability Evaluation Form
- Leave Option Form (Form FR-26)
- Copy of the most recent Workers' Compensation informational brochure

5) As soon as possible following a reported incident, an incident investigation team will review all documentation and complete Parts I, II and IV of the Incident Investigation Summary Form I-2.

6) All documentation (Forms 19, I-1, I-2 and 140, and previous accident history) will be compiled and forwarded to the Incident and Injury Investigation Subcommittee at the time of completion.

7) The Safety Officer and/or Investigating Supervisor will review the incident documentation, determine what corrective actions have been taken and make a report to the Incident and Injury Investigation Subcommittee.

8) The Subcommittee will review all data and complete Part III of the Incident Investigation Form I-2 and forward a copy of Form I-2 to Safety and Loss Control.

9) The Subcommittee will compile trends in their area and make a report at the regularly scheduled full Committee safety meeting. (See section A of this chapter for full Committee safety meeting frequencies.)

Note: Forms are included in Chapter 7.

Chapter 5

Division of Motor Vehicles

A. Vehicle Registration Section

(See Chart 11)

The Director's committee, chaired by the Director, will include a member of the Director's staff, the Administrative Assistant and the Assistant Directors. These meetings will be held monthly.

Staff safety meetings for all central employees will be held according to the generic program guidelines.

Field personnel will have a monthly safety contact by their supervisor, and a group safety meeting will be held in conjunction with the Field Supervisors' Meetings.

The Registration Section will follow the audit program described in the generic section of this manual.

B. School Bus and Traffic Safety Section

(See Chart 12)

The Director's safety committee, the Assistant Director and Field Supervisors will meet every two months.

Field Supervisors will meet individually with each employee under their supervision every two months.

The Director, Assistant Director and Trainer will each audit two specialists per year. Supervisors will audit each specialist once per year "behind the wheel" and once per year "in the classroom."

C. International Registration Section

(See Chart 13)

The Director's committee will include the Assistant Director and the Title Examination Supervisor III. This meeting will be held monthly.

Central IRP personnel will follow the generic program for meetings and audits. Field personnel will have a monthly safety contact from their supervisors.

D. Collision Reports and General Services Section

(See Chart 14)

The Director's committee will consist of permanent and rotating members. The permanent members are Stock Room Supervisor, Mail Room Supervisor II, Reproduction Supervisor, Financial Responsibility Supervisor, Data Entry Supervisor II and Microfilm Unit Supervisor. Rotating members are Traffic Data Processing Coordinator, Accident Records Clerical Supervisor, Coding Supervisor, Pre-evaluation Supervisor and Post-evaluation Supervisor. The Director's committee will meet bimonthly. Rotating committee members will serve four-month terms.

All supervisors will follow the generic program schedule for safety meetings.

The Section Director will conduct quarterly audits rotating between groups. All groups, with the exception of the Stock Room, Mail Room, and Reproduction, will audit in accordance with the generic program. The above-mentioned groups will conduct monthly facility audits. It is suggested that personnel from other Sections assist in the audits.

E. Driver License Section

(See Chart 15)

The Director's committee will include the Assistant Directors, the Commercial Drivers License Coordinator, the Chief Examiners and the Administrative Assistant. This committee will meet monthly.

The Adjudication Division of the Driver License Section will follow the generic program for meetings and audits as presented earlier in the manual.

Chief Examiners will meet bimonthly with District Supervisors. The District

Supervisors will then meet bimonthly with their Senior Examiners. The Senior Examiners will make an individual safety contact with each of their examiners every two months.

Audits of the field units will be conducted as follows. The Director will conduct audits of two field offices per year. The Assistant Director for Certification in conjunction with the Chief Examiners will conduct two field audits per year. The District Supervisors will conduct two audits per year. Senior Examiners will also conduct two audits of their employees per year.

Adjudication will audit in accordance with the procedures described in the generic portion of the program.

F. Enforcement Section

(See Chart 16)

The Director's Safety Committee will include the Assistant Directors, the Administrative Assistant and the Training Officer. This committee will meet every two months.

The Assistant Director for Support Services will make an individual safety contact with each District Supervisor every two months.

The District Supervisors will incorporate a safety meeting into their regular monthly training classes.

The Director, Assistant Director for Support Services and the Training Officer will audit each District every two months. The District Supervisors will audit each office once per year.

Office environments will be audited according to the schedule in the generic program.

G. Incident Inquiry

Refer to and follow the procedures listed under Incident Investigation (Paragraph E) in Chapter Two (Generic Program).

Chapter 6 Ferry Division

A) Safety Committees

The safety committees will consist of line organization personnel with Safety and Loss Control acting as a support organization. Each committee will be comprised of top managers in a section and will refer findings up the committee structure. Each committee will be responsible for:

1. Originating, modifying, coordinating and guiding the safety program.
2. Approving safety policies.
3. Exchanging safety information on a section-wide basis.
4. Reviewing trends in their area.

All groups within the department will be expected to utilize the committee meeting structure (See Chart 1). A sample agenda is provided in this document to aid the committees (Figure 1).

DOCUMENTATION: Minutes for all committee meetings should be kept and copies should be sent to Safety and Loss Control and the next higher level committee for review and appropriate action.

Figure 1: Sample Agenda

- I. Opening Remarks
- II. Accident and Injury Status Report
- III. Old Business
- IV. Subcommittees' Reports
- V. New Business
- VI. Safety Awards

Ferry Director's Safety Committee

(See Chart 16)

The Director's committee will consist of the Assistant Directors, all Superintendents and the Administrative Officer. The Marine Engineer will attend at the discretion of the Director. This Committee will meet monthly.

The Director will also hold a Staff Safety Meeting for the personnel in his office.

B) Subcommittees

To aid the safety committees, a system of subcommittees will be established. These subcommittees will be chaired by committee members and made up of volunteers from the work units. These committees may or may not meet on a regular basis, depending upon need. Subcommittee meetings would occur just prior to full committee meetings. The following is a list of these subcommittees:

- 1) **Incident and Injury Investigation**
Review incident investigations, statistics and trends, and monitor compliance with recommendations.
- 2) **Audit Review**
Review audit reports, compile and analyze data, and make periodic safety and housekeeping inspections.
- 3) **Safety Programs or Special Activities**
Develop safety programs, safety awards and incentive programs, and guide subordinate units' efforts.
- 4) **Off-the-Job Safety**
Plan, develop and promote material for off-the-job safety programs.
- 5) **Policy and Procedures Review**
Periodically review policies, procedures, rules and operations to ensure that all necessary safety precautions are being taken.
- 6) **New Equipment Acceptance**
Inspect new equipment and facilities to

ensure that all safeguards have been provided.

Subcommittees will keep minutes and report to their respective committees.

In addition to standard subcommittees, the Ferry Division may find it necessary to utilize a subcommittee to establish trends in passenger accidents on ferries. These accidents should be evaluated for possible corrective actions or preventative measures on the ferry.

C) Safety Meetings

Safety meetings are very useful ways of training our employees and they are a vital part of the Department's safety atmosphere. Safety meetings should be used to present information, discuss problems and new ideas, and discuss recent accidents and injuries. These meetings can vary greatly in length, but should be held on a regular schedule to keep safety on the employees' minds. A meeting planner is attached to aid supervisors in planning for and conducting their meetings (See Form M-1).

Safety meetings involve employees in the safety program. They can conduct meetings, report on special projects and lead group discussions. All employees are required to attend safety meetings.

DOCUMENTATION: Only monthly meetings will be recorded (See Form M-2). One copy of this form should be forwarded to the lowest safety committee responsible for that unit. Weekly and daily meetings will not be documented; however, a checklist is enclosed for reference (See Form M-3).

Assistant Director for Maintenance and Materials Safety Meeting (See Chart 17)

Safety Meetings will include the Shipyard Superintendent and Field Maintenance Supervisors. These meetings will be held monthly and include both previously prepared topics and current events.

Maintenance Safety Meetings

(See Chart 17)

Supervisors will meet with their units monthly.

Dredge Section Safety Meetings

(See Chart 16)

- 1) The Dredge Superintendent will hold monthly safety meetings with the crew of the tug Albemarle, the dredge Carolina's Captains and the construction crew that supports the dredge. The Captains will meet with their crews during their respective shifts.

Operations Safety Meetings

(See Chart 18)

- 1) Superintendents will hold monthly meetings with their supervisors. This will take two meetings due to shift work.
- 2) Supervisors/Port Captains will hold monthly meetings with their Captains and Shore Support Personnel. This will also take two meetings.
- 3) Captains will hold monthly safety meetings with their crews.

D) Auditing

Auditing is an important key to improved safety performance. Auditing identifies unsafe acts and practices before an injury takes place. Audits should be both announced and unannounced.

When used properly, auditing can:

- 1) Maintain standards by ensuring that employees follow NCDOT rules and procedures.
- 2) Identify where rules or procedures are insufficient.
- 3) Measure the effect of safety education.
- 4) Reveal weaknesses in the safety program.
- 5) Motivate employees by showing the results of their safety efforts.
- 6) Increase safety awareness.

Supervisors will be responsible for auditing. New supervisors will be trained in the methods of auditing by being shown sample conditions and practicing audits (See Form R-1).

DOCUMENTATION: Completed audit forms should be submitted to the next level of management and to the lowest Audit Review Subcommittee responsible for that unit.

Maintenance Audits

- 1) Supervisors will audit their sections weekly.
- 2) Assistant Director will audit each shop semiannually.
- 3) Plant Maintenance Supervisors will conduct an on-site audit weekly. They will also conduct a monthly audit of current field projects as applicable.

Dredge Superintendent Audits

- 1) The Tug Captain will audit the ship weekly. The Dredge Superintendent will audit the tug monthly.
- 2) The Dredge Captain will audit the Carolina's Captains weekly. The Superintendent will audit the Carolina's Captains monthly.
- 3) The Dredge Superintendent will audit the construction crews monthly.

Operations Audits

- 1) Ferries will be audited weekly by the Captains.
- 2) Supervisors/Port Captains will audit ferries and shore facilities monthly.
- 3) The Superintendent will audit each Operation Unit once per quarter.

E) Incident Investigation

An incident is an event that could have, or did, result in personal injury or damage to state or private property. **Investigations of these incidents are important for the prevention of future accidents and tracking the quality of our safety program.** Incident investigations will not be a fault-finding process. Once an incident has occurred, it is important to prevent it from happening again.

As soon as possible following a reported incident, the Unit Supervisor will assemble an incident investigation team. The team will always include the Unit Supervisor, the immediate

Supervisor and a peer of the employee(s) involved. Additional management, technical and safety support staff and the involved employee(s) should be included as needed. There should be a rotation for the selection of the peer for the teams.

Inclusion of the employee(s) involved generally improves the response of other employees to the team's recommendations and can be a valuable resource in discovering vital underlying facts.

The results of the investigation should be communicated to the employees and other supervisors to prevent recurrence of this incident in other groups.

Investigation reports should be reviewed by the Incident and Injury Investigation Subcommittee responsible for that unit. The first line supervisor is responsible for ensuring that the recommendations are implemented. The subcommittees will certify that corrective actions have been taken and documentation is consistent.

DOCUMENTATION:

- 1) Employees will report the incident to the supervisors immediately.
- 2) Employees will complete the Employee's Statement Form I-1 and shall return it to their supervisor within one day of the incident. The supervisor shall forward a copy of Form I-1 to Safety and Loss Control within two days of the incident. If a piece of equipment was involved, a Form 140 will also be completed and a copy forwarded to Safety and Loss Control within two days.
- 3) If an injury has resulted, the immediate supervisor will complete the North Carolina Industrial Commission Form 19 and **send within one day from the date of the knowledge of the injury the original and one copy of Form 19 to NCDOT's Workers' Compensation Unit** and one copy to each of the following:

-
- The injured employee
 - Safety and Loss Control
 - Division/Unit Safety Officer

(NC Industrial Commission requires a Form 19 within five days of the date of the knowledge of the injury.)

4) Provide the injured worker the following:

- Employee Statement Form (Form I-1)
- NCDOT Medical Authorization/Return to Work Form
- NCDOT Work Ability Evaluation Form
- Leave Option Form (Form FR-26)
- Copy of the most recent Workers' Compensation informational brochure

5) As soon as possible following a reported incident, an incident investigation team will review all documentation and complete Parts I, II and IV of the Incident Investigation Summary Form I-2.0

6) All documentation (Forms 19, I-1, I-2 and 140, and previous accident history) will be compiled and forwarded to the Incident and Injury Investigation Subcommittee at the time of completion.

7) The Safety Officer and/or Investigating Supervisor will review the incident documentation, determine what corrective actions have been taken and make a report to the Incident and Injury Investigation Subcommittee.

8) The Subcommittee will review all data and complete Part III of the Incident

Investigation Form I-2 and forward a copy of Form I-2 to Safety and Loss Control.

9) The Subcommittee will compile trends in their area and make a report at the regularly scheduled full Committee safety meeting. (See Section A of this chapter for full Committee safety meeting frequencies.)

Note: Forms are included in Chapter 7.

A 5010 (12-7)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION MONTHLY SAFETY MEETING REPORT

Department Code _____ Date _____

Unit: _____ District: _____ Division: _____

Address: _____

Meeting Chairman: _____

Where feasible attendance should be documented.

Other Persons Present: _____

Formal Presentation: (Name of presenter and topic): _____

Other Subjects Discussed: _____

Reports on Weekly Meetings: _____

Employee's Comments/Suggestions: _____

Chairman's Signature

10/2014

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION SAFETY CHECKLIST

Supervisor should use the following as a guide when conducting weekly or daily safety meetings. This list should be modified as needed to work effectively.

Operation and work location: _____

Traffic control required: _____

Equipment required: _____

Are all traffic control devices onboard vehicle?: _____

Is the equipment right for the job? _____

Are all devices in good condition? _____

Is equipment performing correctly? _____

Are hazardous chemicals to be used? _____

Is operator aware of equipment limitations? _____

If so, have appropriate safeguards been taken? _____

Personal protective equipment needed: _____

Have appropriate SOPs been reviewed? _____

Do all employees have adequate personal protective equipment ? _____

Safety Message: _____

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

WORKSITE AUDIT

Date: _____ Time: _____ AM/PM Auditor: _____

Division: _____ Department: _____ County: _____

Worksite/Location: _____

In-Travel Lane? _____ Posted Speed Limit: _____

Operation/Facility being audited: _____

Category	Rating			Observations/Corrective Actions <small>S=Satisfactory, U=Unsatisfactory, N/A=Not Applicable</small>	Abatement Date <small>if corrective action is needed</small>
	S	U	N/A		
Safety Equipment					
Hard Hat					
Vest					
Shoes					
Seat Belt					
Eye Protection					
Gloves					
Ear Protection					
Traffic Control					
Signs					
Work Zone Length					
Flaggers					
Cones, Drums					
Arrow Boards, Attenuators					
Sight Distance					
Other					
Facility					
Hazardous Material					
Housekeeping					
Lockout					
Fire Protection					
Confined Space					
Work Surfaces					
Other					
Tools & Equipment					
Right for Job					
Used Correctly					
In Safe Condition					
Other					

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

FACILITY AUDIT AND SECURITY CHECK

Date: _____ Time: _____ No. of people audited: _____
 Dept: _____ Div: _____ Section: _____ County: _____
 Facility audited: _____

S=Satisfactory, U=Unsatisfactory, N/A=Not Applicable. All items should be checked to indicate review.

	S	U	N/A
1. First Aid			
a. Certified first aid assistance available			
b. Emergency numbers posted			
2. Fire Protection			
a. Emergency plan understood/posted			
b. Extinguisher charged/conspicuous location			
c. Access to fire equipment			
d. Lights/doors/signs			
e. Employee trained in on use of extinguishers			
f. Other			
3. Security			
a. Doors/windows, etc. secured when required			
b. Department shutdown security			
c. Equipment secured			
d. Unauthorized entry policy adhered to			
e. Other			
4. Machinery			
a. Operating machines attended			
b. Emergency stops operational			
c. Platforms/ladders/catwalks			
d. Instructions to operate/stop posted			
e. Maintenance performed			
f. Guards in place			
g. Area free from pinch points			
h. Lock-out policy posted/adhered to			
i. Other			
5. Material Storage			
a. Hazardous & flammable materials identified			
b. Hazardous & flammable materials storage			
c. Stacking/loading security			
d. Lighting, warning signs, ventilation			
e. Other			
6. Policy Procedures			
a. Specific details of work assignment given			
b. Oriented/trained for job			
c. Informed and aware of job hazards			
d. Demonstrate job skills			
e. Use of safety equipment			
f. Other			
7. Miscellaneous			
a.			
b.			
c.			
d.			

	S	U	N/A
8. Illumination-Wiring			
a. Necessary and used properly			
b. Lights on during shutdown			
c. Wire Condition			
d. Circuits loading			
e. Machinery grounded			
f. Proper wiring in hazardous location (wash house)			
g. Wall outlets/extension cords			
h. Adequate lighting			
i. Glare/eye strain			
j. Other			
9. General Area			
a. Floor condition			
b. Special purpose flooring			
c. Aisle, clearance/markings			
d. Floor openings, safeguards			
e. Railings, stairs, temp./perm.			
f. Piping (water-steam-air)			
g. Wall damage/ceiling damage			
h. Ventilation			
i. Wet floor policy posted/adhered to			
j. Other			
10. Housekeeping			
a. Floors			
b. Machines			
c. Waste disposal			
d. Vending machines/food			
e. Rodent, insect, vermin control			
f. Other			
11. Vehicles			
a. Cleanliness of vehicle			
b. Unauthorized use			
c. Operating defective vehicle			
d. Vehicle operation			
e. Obeying traffic rules			
f. Seat belt use			
g. Certified in defensive driving			
12. Tools			
a. Power tool wiring			
b. Condition of hand tools			
c. safe storage			
d. Other			

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION – FERRY DIVISION

FERRY SAFETY AUDIT AND SECURITY CHECK

Ferry: _____ Operation: _____

Date: _____ Day: _____

S=Satisfactory, U=Unsatisfactory, N/A=Not Applicable. All items should be checked to indicate review.

	S	U	N/A
1. Ferry Equipment			
a. Life saving equipment			
b. Inflatable life raft			
c. Navigation lights			
d. Horn, bell & compass			
e. Radios, loran & radars			
f. Anchor gear			
g. Fuel shut-off valves & reach rods			
h. Steering gear & emergency steering			
i. Bilge pumping system			
j. Water-tight hatches, gaskets & knife edges			
k. Other			
2. First Aid			
a. Stretchers and kits			
b. Certified first aid assistance available			
3. Fire Protection			
a. Emergency plan/Fire drill preparation			
b. Extinguishers in place & charged			
c. Fire pumps & hoses			
d. Employees sufficiently trained			
e. Other			
4. Security			
a. Doors/windows, etc. secured when required			
b. Equipment secured			
c. Unauthorized entry policy adhered to			
d. Other			
5. Machinery			
a. Operating machines attended			
b. Emergency stops operational			
c. Platforms/ladders/catwalks			
d. Maintenance			
e. Guards in place			
f. Tagout policy adhered to			
g. Piping			
h. Ventilation			
i. Other			
6. Material Storage			
a. Hazardous materials identified & labeled			
b. Hazardous materials stored properly			
c. Other			
7. Wiring & Lighting			
a. Wire condition			
b. Circuit loading			
c. Lighting adequate			
d. Other			

	S	U	N/A
8. General Area			
a. Traffic patrol & chocking procedures			
b. Deck condition			
c. Deck markings			
d. Deck openings and protective guard rail			
e. Railings, stairs			
f. Door closures			
g. Other			
9. Housekeeping			
a. Decks			
b. Machinery			
c. Waste disposal			
d. Other			
10. Tools			
a. Power tool wiring			
b. Condition of tools			
c. Other			
11. Policy Procedures			
a. Specific details of work assignment given			
b. Employees oriented/trained for job			
c. Informed and aware of job hazards			
d. Job skills demonstrated			
e. Safety equipment used			
f. Other			
12. Personal Protection Devices			
a. High visibility vests			
b. High visibility foul weather gear			
c. Safety-toe shoes			
d. Hearing protection			
e. Gloves			
13. People			
a. Positioning			
b. Lifting techniques			
c. Handling electricity			
d. Communication techniques			
e. Other			

Auditor Signature

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION EMPLOYEE'S STATEMENT

Employee Name: _____ Employee SS#: _____

Employee Title: _____

Division: _____ County: _____ Department #: _____

Date of Incident: _____ Date Incident Reported: _____

* Description of Incident (What happened?): _____

** If this incident involved a backing accident, please answer the questions on the back of this form.*

Incident Witnesses- Yes No: If checked yes, list name(s) & telephone number(s) on back.

Cause of Incident (What caused it to happen?): _____

How could this incident have been prevented: _____

I CERTIFY THAT I HAVE READ THE ABOVE INFORMATION AND THAT IT IS A TRUE, ACCURATE, AND FACTUAL STATEMENT. I FURTHER CERTIFY THAT IF I AM THE INJURED PARTY THAT MY INJURY/ILLNESS AROSE OUT OF AND IN THE COURSE OF MY EMPLOYMENT WITH NCDOT. (I HAVE READ THE ABOVE OR IT HAS BEEN REVIEWED AND EXPLAINED TO ME.)

Employee's Signature

Date

Employee Home Address (only if above is injured party)

Home Phone (Area Code-Local Number)

Print Witness Name (For statement and signature only)

Witness Signature

Date

Backing Accident Information

Yes No

1) • Were there any passengers in your vehicle or employees in the immediate area that could have assisted you at the time of the accident?

2) List the names of all passengers or employees in the immediate area:

Yes No

3) • Before backing your vehicle, did you request assistance from any passengers or employees in the area ?

4) If you answered "No" for question number 3, please explain why:

Driver's Signature

Incident Witnesses List

Name

Phone Number (Area Code-Local Number)

Name	Phone Number (Area Code-Local Number)
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Attach completed form to Form I-2.

7	<p>Fill in the following space showing direction & positions of automobiles involved, designating clearly point of contact.</p> <p style="text-align: right;">Indicate by arrow direction of north </p> <p>Instructions:</p> <p>1. Use solid line to show path of vehicle before accident   Dotted line after accident</p> <p>2. Number each vehicle & show direction of travel. </p>
8	<p>Witnesses and remarks (provide witnesses names & addresses)</p> <hr/> <hr/> <hr/>
9	<p>Travelers Insurance Company notified (if applicable): Date: _____ How _____ Time _____ AM/</p>
0	<p>Traffic citations (X if applicable): Driver of Veh. No. 1 <input type="checkbox"/> Driver of Veh. No. 2 <input type="checkbox"/> Driver of Veh. No. _____ <input type="checkbox"/></p> <p>Violations charged _____ Name and address of investigating officer _____</p> <hr/>
1 rown jects by icks/ wers	<p>When did claimant advise operator of alleged accident? At scene _____ Other Location _____</p> <p>Distance from scene _____ Was operator aware his equipment caused the damage? _____</p> <p>Was load or mower inspected by supervisor following the accident? _____ If so, when? _____</p> <p>Truck: Was truck properly loaded to avoid spillage? _____ Was object reported to have been thrown by wheel? _____ Was there evidence of stone or dirt on body or chassis rails? _____</p> <p>Mower: Condition of area being mowed—Rocky <input type="checkbox"/> Rough & Uneven <input type="checkbox"/> High Grass <input type="checkbox"/> Normal <input type="checkbox"/> Intersection <input type="checkbox"/></p> <p>Other _____ Were safety shields in place? _____ At what height was mower set to cut? _____</p> <p>Was mower traveling with flow of traffic? _____ Against flow of traffic? _____</p> <p>Distance of mower from claimant's vehicle _____ Comments _____</p> <hr/> <hr/> <hr/>

INCIDENT INVESTIGATION

Employee Name (s) _____ SS# _____
Division: _____ County: _____ Department #: _____ No. Employees Injured: _____
No of Private Parties Injured: _____ Date of Incident: _____ Date Incident Reported: _____

Note: Form 19 must be completed for each employee injured.

Part I: Incident Investigation (To be completed by Incident Investigation Team)

Description of incident (What happened?): _____

Cause of Incident (What caused it to happen?): _____

Corrective action: _____

Person responsible for corrective action: _____

Part II: Post-Accident Testing (To be completed by Incident Investigation Team)

Controlled substance and alcohol tests are to be conducted following ANY ACCIDENT an employee is involved in while on duty where:

- A life was lost.
- If operating a motor vehicle, the driver was cited for a moving traffic violation and individuals involved were transported for medical treatment.
- If operating a motor vehicle, the driver was cited for a moving traffic violation and a vehicle involved was disabled and removed from the scene by other than its own power.

Yes No

- Did any of the above conditions result from this accident?
- If the previous question was answered yes, was post-accident testing conducted in accordance with NCDOT's Controlled Substance Abuse and Alcohol Misuse Policy and Procedure? If no, please state why no post-accident testing was conducted. _____

Investigation team members: _____

Investigating Supervisor's Signature: _____ Date of Investigation _____

SS #: _____

Send completed Parts I, II and IV to Incident and Injury Investigation Subcommittee.

Part III: Status of Corrective Action (To be completed by Incident and Injury Investigation Subcommittee)

Safety Officer/Investigating Supervisor: _____

Incident Subcommittee Members: _____

Has corrective action been completed? _____

Comments: _____

Subcommittee Chairman: _____ Subcommittee review date: _____

Part IV: Statistical Data—Personal Injury (To be completed by Incident Investigation Team. Please circle the appropriate categories.)

A. Personal Injuries

Nature of Injury(ies)

- 1 Amputation
- 2 Burn
- 3 Bruise
- 4 Concussion
- 5 Cut (Puncture or Open)
- 6 Rash
- 7 Electric Shock
- 8 Inhalation Injury
- 9 Freezing/Frostbite
- 10 Hearing Impairment
- 11 Heat Exhaustion, Sunstroke
- 12 Hernia
- 13 Scratches, Abrasions
- 14 Strains/Sprains
- 15 Fracture
- 16 Insect Bites
- 17 Multiple Injuries
- 00 Repetitive Motion
- 99 Miscellaneous (Other)

Part(s) of Body Affected

- 1 Head/Face
- 2 Eyes
- 3 Arm(s)
- 4 Hand(s)/Finger(s)
- 5 Abdomen
- 6 Back
- 7 Chest
- 8 Hips /Pelvis
- 9 Shoulder
- 10 Wrist
- 11 Ankle
- 12 Leg
- 13 Feet/Toe(s)
- 14 Knees
- 15 Upper Multiple
- 16 Lower Multiple
- 17 Upper and Lower Multiple
- 99 Other _____

Source of Injury

- 1 Animals
- 2 Insects
- 3 Slips
- 4 Trips/Falls

- 5 Chemicals
- 6 Petroleum Products
- 7 Gases
- 8 Asphalts
- 9 Extreme Temperatures
- 10 Motors
- 11 Electrical Devices
- 12 Starter/Batteries
- 13 Vegetation/Tree
- 14 Sunburn
- 15 Heating Apparatus
- 16 Fire/Smoke
- 17 Pipe
- 18 Hand Tools
- Type _____
- 19 Power Tools
- Type _____
- 20 Hoisting Apparatus
- Type _____
- 21 Ladders
- 22 Liquids
- Type _____
- 23 Metal Items
- 24 Vehicles
- 25 Machines/Equipment
- 26 Office Equipment
- 27 Containers
- 28 Lifting, pulling, pushing
- 29 Wood Items
- 99 Other

Severity of Injury

- 1 Fatal
- 2 Permanent total disability
- 3 Permanent partial disability
- 4 Temporary disability
- 5 First aid case
- 6 Doctor visit only

B. Equipment Involving Personal Injuries

Machines/Equipment

- 1 Crushing, Pulverizing, Mixing
- 2 Drilling, Auger
- 3 Drilling, Turning
- 4 Heavy Equipment
- Class Code _____

- 5 Other

Vehicles

- 1 Passenger
- 2 Trailer
- 3 Vehicle Tailgates
- 4 Handtrucks/Dollies
- 5 Forklifts
- 6 Tractors & other powered towing machines
- 7 Other _____
- Class Code _____

C. Personal Injury Accident Type

Striking against Object

- 011 Objects being handled
- 012 Stationary Objects
- 013 Moving objects
- 014 Other _____

Caught In, Under or Between

- 021 Object being handled
- 022 Moving & stationary object
- 023 Two moving objects
- 024 Collapsing material
- 025 Machine or machine parts
- 026 Other _____

Fall from Elevation

- 031 From scaffold/ladder
- 032 From piled materials
- 033 From vehicles
- 034 On stairs
- 035 Into openings
- 036 Other _____

Fall on same Elevation

- 041 To walkway of working surface
- 042 Onto or against object
- 043 Other _____

Struck by Object

- 051 Tool or machine in use
- 052 Falling or flying object
- 053 Tipping, slipping or rolling object
- 054 Object being handled by another person
- 055 Other _____

Miscellaneous

- 061 Foreign matter in eyes
- 062 Contact with electrical

- current
- 063 Motor vehicle accident
- 064 Other _____
- 065 Contact w/ poisonous plant
- 066 Lifting, pulling or pushing objects
- 067 Insects
- 068 Repetitive motion
- 069 Reaction to involuntary motion
- 070 Reaction to voluntary motion

D. Cause(s) of Personal Injury

Unsafe Condition

- 1 Inadequate ventilation
- 2 Insufficient workspace
- 3 Improper illumination
- 4 Use of inadequate or improper tool or equipment
- 5 Improper assignment of personnel
- 6 Improperly positioned
- 7 Inadequately secured
- 8 Unguarded, mechanical
- 9 Inadequate shoring
- 10 Electrical hazard
- 11 Unshielded radiation
- 12 Other _____
- 13 No Unsafe Condition

Unsafe Act

- 1 Cleaning, adjusting, oiling, or moving equipment
- 2 Welding or repairing equipment without supervision
- 3 Working on electrically charged equipment
- 4 Failure to use personal protective equipment
- 5 Failure to secure
- 6 Failure to warn others
- 7 Failure to shut off equipment not in use
- 8 Failure to place warning signs, signals, etc.
- 9 Horseplay, fighting, etc.
- 10 Improper use of equipment

- 11 Overloading
- 12 Improper handling
- 13 Inattention to footing or surroundings
- 14 Disconnecting or changing safety devices
- 15 Jumping from elevations (vehicles, etc.)
- 16 Running
- 17 Throwing materials or tools
- 18 Riding in unsafe position
- 19 Unnecessary exposure under suspended loads
- 20 Operating at unsafe speed
- 21 Improper backing
- 22 Failure to obey traffic laws
- 23 Injecting or mixing substances to create hazard
- 24 Using unsafe equipment
- 25 Other _____
- 26 No Unsafe Act Observed

E. Safety Equipment in Use

- 1 Hard hats
- 2 Safety glasses
- 3 Respirator
- 4 Movable exhaust hood
- 5 Ear protection
- 6 Safety shoes
- 7 Lanyards & lifelines
- 8 Fluorescent vest
- 9 Flags
- 10 Buoyant work vest
- 11 Chemical apron
- 12 Faceshield
- 13 Gloves
- 14 Seatbelt/shoulder harness
- 15 Other restraining device
- 16 Other _____
- 17 Adequate Safety Equipment Not Used
- 18 Insect Repellent

F. Training

Relative to this incident, was training provided? _____ (Y/N)
Year _____

Equipment Accidents

A. Roadway Condition:

- 1 Dry
- 2 Wet
- 3 Snow/Ice
- 4 Mud

B. Weather:

- 1 Clear
- 2 Cloudy
- 3 Fog

- 4 Misting
- 5 Rain
- 6 Snow/Sleet/Ice
- 7 Smoke/Dust

C. Type of Equipment Accident

- 1 Turning
- 2 Backing
- 3 Rear-end Collision
- 4 Struck by other vehicle
- 5 Object dropped on vehicle

- 6 Hit stationary object
- 7 Ran off road
- 8 Passing
- 9 Moving from parked position
- 10 Rolled from parked position
- 11 Mechanical Failure
- 12 Hit animal
- 13 Overturned
- 14 Flying Object
- 15 Other _____

- 16 Struck other vehicle

D. Causes of Equipment Accidents

- 1 Operating at unsafe speed
- 2 Improper backing
- 3 Failure to obey traffic laws
- 4 Injecting or mixing substances to create hazard

- 5 Using unsafe equipment
- 6 Other _____
- 7 No Unsafe Act Observed
- 8 Inattention to surroundings
- 9 Lack of Training on equipment being used

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION EQUIPMENT ACCIDENT AND PROPERTY DAMAGE REPORT

Safety & Loss Control
Registration Number

e 1

1
Accident

List all divisions, units or sections involved _____

Location of accident _____
 _____ (County) _____ (Hwy. No.) _____ (City or Miles)
 _____ Date _____, 19____, _____ AM/F
 _____ (East, West, No., So.) _____ (of City or Intersection)
 _____ Roadway _____ MPH _____
 _____ (Day of Week) _____ (Speed Limit) _____ (No. of Lanes) _____ (Lane Width) _____ (Surface Material)

2
Involved Operators/Employees

Veh. No. 1: Name _____ S.S. No. _____ Dept. Code _____ Co. No. _____ Age _____
 Address _____ Bus. Phone _____ Home Phone _____
 Driver Lic. No. _____ Class (A, B, C) _____ Driving Experience _____
 Classification _____ Temporary Service. (Yrs.) _____ Permanent Service (Yrs.) _____
 Dates of previous accidents while driving state equipment _____

Veh. No. 2: Name _____ S.S. No. _____ Dept. Code _____ Co. No. _____ Age _____
 Address _____ Bus. Phone _____ Home Phone _____
 Driver Lic. No. _____ Class (A, B, C) _____ Driving Experience _____
 Classification _____ Temporary Service. (Yrs.) _____ Permanent Service (Yrs.) _____
 Dates of previous accidents while driving state equipment _____

3
State Equipment/Injuries

State Veh. No. 1: Equip. No. _____ Lic No. _____ Make & Type _____ Year _____
 Equip. Damage: (describe fully) _____
 Est. Cost of Repair _____ Who made estimate _____
 Speed at time of accident (mph) _____ Injuries (describe fully, include names) _____

State Veh. No. 2: Equip. No. _____ Lic No. _____ Make & Type _____ Year _____
 Equip. Damage: (describe fully) _____
 Est. Cost of Repair _____ Who made estimate _____
 Speed at time of accident (mph) _____ Injuries (describe fully, include names) _____

NOTE: FORM 19 MUST BE COMPLETED FOR EACH EMPLOYEE INJURED.

4
State Parties to their Equipment

Veh. No. _____ Name _____ Address _____ Home Phone _____
 Business Phone _____ Age _____ Driver Lic.No. _____ Veh. Make/Type/Year _____
 Veh. Lic. No. _____ State _____ Speed at time of accident (mph) _____ No. of other occupants _____
 Liability insurance company (name, address & policy number) _____

 Owners name and address (if different from driver) _____
 Est. damage to veh. _____ Describe injuries to all occupants (identify by name and age) _____

5
Property Damage

Property Damage _____

 Estimated value of property before accident _____ Estimated cost to repair or replace _____
 (Note: Complete items 4 and 5 on persons involved in property damage.)

6
Description of Accident

Description and cause of accident _____

I have investigated this accident and answered all questions fully and accurately:

Supervisor's Name Typed Here _____ Supervisor's Signature _____ Date _____

7	<p>Fill in the following space showing direction & positions of automobiles involved, designating clearly point of contact.</p> <p style="text-align: right;">Indicate by arrow direction of north </p> <p>Instructions:</p> <p>1. Use solid line to show path of vehicle before accident   Dotted line after accident</p> <p>2. Number each vehicle & show direction of travel. </p>
8	<p>Witnesses and remarks (provide witnesses names & addresses)</p> <p>_____</p> <p>_____</p> <p>_____</p>
9	<p>Travelers Insurance Company notified (if applicable): Date: _____ How _____ Time _____ AM/</p>
0	<p>Traffic citations (X if applicable): Driver of Veh. No. 1 <input type="checkbox"/> Driver of Veh. No. 2 <input type="checkbox"/> Driver of Veh. No. _____ <input type="checkbox"/></p> <p>Violations charged _____ Name and address of investigating officer _____</p> <p>_____</p>
1 rown jects by icks/ wers	<p>When did claimant advise operator of alleged accident? At scene _____ Other Location _____</p> <p>Distance from scene _____ Was operator aware his equipment caused the damage? _____</p> <p>Was load or mower inspected by supervisor following the accident? _____ If so, when? _____</p> <p>Truck: Was truck properly loaded to avoid spillage? _____</p> <p>Was object reported to have been thrown by wheel? _____</p> <p>Was there evidence of stone or dirt on body or chassis rails? _____</p> <p>Mower: Condition of area being mowed—Rocky <input type="checkbox"/> Rough & Uneven <input type="checkbox"/> High Grass <input type="checkbox"/> Normal <input type="checkbox"/> Intersection <input type="checkbox"/></p> <p>Other _____ Were safety shields in place? _____ At what height was mower set to cut? _____</p> <p>Was mower traveling with flow of traffic? _____ Against flow of traffic? _____</p> <p>Distance of mower from claimant's vehicle _____ Comments _____</p> <p>_____</p> <p>_____</p> <p>_____</p>

SUPPLEMENTAL REPORT OF INJURY

If Form 19, First Report of Injury, did not show that the injured employee had returned to work, This Form 19-S, Supplemental Report of Injury, must be completed and forwarded immediately upon the return to work of the employee, or upon termination of employment, death or retirement of the injured employee. Send the original of the completed form to Safety and Loss Control and a copy to the Workers' Comp Unit, Fiscal Section. All questions must be answered fully. (Please print clearly or type.)

Employee	1. Employee Name _____ 2. SSN# _____ 3. Department Code _____ 4. Date of Injury _____ 5. Nature of Injury _____ _____ _____ _____
Return to Work	6. Date and time employee returned to work _____ Yes No 7. <input type="checkbox"/> <input type="checkbox"/> • Was the employee transferred to another job due to restrictions? 8. <input type="checkbox"/> <input type="checkbox"/> • Was employee placed on modified duty? If yes, how long? _____ 9. <input type="checkbox"/> <input type="checkbox"/> • Did the Injured return to work and then lose more time for the same injury? If yes, please explain. _____ _____ _____
Lost Work Days	<p><i>Under the current North Carolina Workers' Compensation Act, there is a 7 calendar day waiting period where no compensation for time lost from work is allowed except when the injury results in disability for more than 21 calendar days. (The 7 calendar day waiting period begins the day after the injured employee receives medical treatment.) If the disability exceeds 21 calendar days, then compensation is allowed from the date of the disability.</i></p> 10. Total number of calendar days off from work _____ 11. As applicable, enter the number of days of each appropriate category from which the injured employee was paid during the 7 calendar day waiting period: _____ Days of Vacation _____ Days of Compensatory Time _____ Days of Sick Leave _____ Days of Administrative Leave _____ Days of Leave Without Pay 12. Total number of Lost Work Days _____
Medical Care	Yes No 13. <input type="checkbox"/> <input type="checkbox"/> • Is this employee still receiving medical care? If yes, what is the estimated length of treatment? _____ 14. Remarks _____ _____ _____
Supervisor	15. Supervisor's Name _____ 16. SSN# _____ 17. Supervisor's Title _____ 18. Signature _____ 19. Date _____

INTRODUCTION TO PROCEDURES

These procedures have been developed to assist managers and employees in carrying out the work activities and operations of the Department in a safe manner. Potential hazards have been identified for typical activities and work sites in each unit, and Safe Operating Procedures written to avoid these hazards. Similar procedures have also been provided for all vehicles, equipment, tools and accessories.

The Safe Operating Procedures have been divided into three sections: General Safe Operating Procedures, Chapter 10; Work Site and Work Activity Safe Operating Procedures, Chapter 11; and Equipment Safe Operating Procedures, Chapter 12. These are preceded by a departmental index, Chapter 9, that lists the procedures applicable in each department. Each crew leader/supervisor will be furnished a safety manual and are expected to keep it with them at all times.

These procedures should not be utilized as substitutes for employee job training. Rather they should serve as a review for performing the tasks safely. These reviews will be conducted during safety meetings.

All procedures are intended to comply with state, local and federal laws. All laws should be strictly adhered to in case of conflict.

The utilization of the Safe Operating Procedures contained in this manual as related to

law enforcement personnel are not intended to be all inclusive or to usurp any standard law enforcement practices. Governing procedures and policies administered by the North Carolina Justice Standards Division are primary governing policies for law enforcement personnel.

Employees are responsible for working in a safe manner. They will also comply with all applicable Safe Operating Procedures in addition to any other safety laws, rules, policies, or procedures.

Employees must wear the required personal protective equipment specified for each operation. Employees are encouraged to report all safety and health problems without fear of retaliation.

Crew Leaders/Supervisors should review appropriate Safe Operating Procedures before beginning new activities, and should review Safe Operating Procedures for routine operations every ten working days.

Crew Leaders/Supervisors are responsible for providing each employee with the appropriate personal protective equipment, and training to perform their assigned tasks.

Crew Leaders/Supervisors are responsible for their employees observing and obeying all applicable Safe Operating Procedures, rules, policies, and laws necessary for their safety and take disciplinary action as needed to obtain compliance.

Accident and Injury Response

1. Take appropriate action to prevent additional injuries and/or accidents.
2. Attend to injured person(s) in accordance with first aid training. The safe working practice for First Aid is an excellent review on how to handle a situation involving personal injury. (Ref. Page 10-5)
3. When an injured employee requires medical treatment, the immediate supervisor is responsible for seeing that prompt medical treatment is provided. The welfare of the injured employee is primary; do not economize; use an ambulance if necessary. A supervisor will accompany the injured employee to the medical facility.
4. For motor vehicle accidents, call the Police and the EMS and fire department when needed.
5. Be courteous, answer police questions, give identifying information to other parties involved. Do not assume responsibility.
6. Complete the information in the Motor Vehicle Accident Reporting Kit provided by the Travelers Company.
7. Employees are required to report minor incidents to their supervisor as soon as possible, or at least before the end of the work shift and before going to a NCDOT preferred provider. If you do not know the name of your preferred provider, contact the Workers' Compensation clerk or Safety Officer.
8. Serious incidents shall be reported immediately. If there is a fatality, an immediate report to the Raleigh Office is also required.
9. If a serious injury or fatality occurs, the highest level supervisor available should meet with family members to explain the circumstances and to provide assistance.

Cold Weather Safety

1. Whenever possible, schedule coldest part of work for the warmest part of the day.
2. Reorganize work procedures to minimize sitting still or standing for long periods of time.
3. All employees who have not been working in the cold environment must adjust to the cold before expecting to be fully productive (5-7 days).
4. Be sure to drink plenty of warm, sweet, caffeine-free, non-alcoholic drinks or soup.
5. Take regular rest breaks.
6. Wear the proper clothing in layers. Cotton, polypropylene or lightweight wool should be next to the skin. Outer garments should be of waterproof, wind resistant material like nylon.
7. A good example of layering would be a wool shirt or sweater over a cotton one and then an outer nylon jacket.
8. Employees should be sure to wear a hat or other head covering as up to 40% of heat loss can occur when the head is exposed.
9. Wear waterproof boots with two pairs of socks. The inner pair should be cotton and the outer pair wool.
10. Employees should wear gloves for light to moderate work anytime the air temperature falls below 40 degrees F.
11. Keep as dry as possible and have extra clothing readily available to change into if you do get wet.
12. Remember! The frequency of accidents is higher in cold weather. Make allowances for your slowed reflexes and numbed hands when doing your job.

Equipment Mounting and Dismounting

1. Park in an area that provides maximum protection for operator and passengers and which provides a solid landing during mounting and dismounting.
2. Do not leave equipment unattended with engine running. Shut off engine and set parking brake when equipment is not in use.
3. When mounting or dismounting equipment, use all steps and all handholds provided.
4. **DO NOT JUMP FROM EQUIPMENT.**
5. Use a three point method in mounting and dismounting equipment. When mounting, face the equipment and using both hands, firmly grasp handholds while placing one foot solidly on step. When dismounting, face the equipment and place both feet solidly on steps and use one hand to firmly grasp handhold.

Computer Data Entry

Hazard Review

Repetitive Motion Illness	Carpal Tunnel Syndrome	Back Discomfort
Neck Strain	Headaches	Eye Strain

1. Adjust seat height and backrest angle to fit the user in a seated position. Thighs should be parallel to the floor or sloping downward slightly. Adjust footrest for proper height and angle.
2. Adjust keyboard to keep forearms parallel to the floor, or sloping downward slightly. Use wrist-rests if necessary to maintain neutral position when needed.
3. Maintain correct hand and wrist posture when entering data. Keep wrists in a neutral position.
4. Position documents roughly perpendicular to the line of sight using a document holder and maintain monitor at eye level. Eyes should look straight ahead or downward 10 to 15 degrees.
5. Locate video display terminals away from windows and/or use anti-glare screens when needed.
6. Use caution when working behind CPU equipment because of multiple cords.
7. Repetitive motion illness develops over an extended period of time. Learn work habits that reduce risks. These include properly adjusting your work station, taking breaks at least every two hours (more often if you are having symptoms) and performing stretching exercises.

Fire Safety

Buildings

1. All employees should know escape routes and locations of fire exits.
2. All fire exits must be unobstructed, unlocked and marked.
3. Fire/smoke alarms should be tested and fire drills conducted regularly.
4. All employees should know the location of and how to use fire extinguishers.
5. Facilities should be periodically inspected to ensure fire extinguishers are charged and to identify and eliminate fire hazards. Fire extinguisher locations should be properly marked.
6. Wiring and/or extension cords used for office machines or other appliances should be checked periodically.

Job Sites

1. When refueling vehicles, turn off engines. No smoking or open flames are permitted in the area.
2. Use extra caution when working with flammable materials on job site. Refer to MSDS.
3. Use only approved marked safety containers for storing and transporting flammable materials.
4. After refueling portable tools/equipment with gasoline engines, move at least 25 feet from refueling site to start engine.
5. Operator should know the location of and how to use the fire extinguishers. Fire extinguishers should be inspected to ensure that they are charged.
6. Allow space for fuel expansion in fuel tanks and containers.

Flagging Traffic

1. Always set up flagging stations so that they are highly visible to traffic with good approach sight distance.
2. **NEVER stand in a lane that is open to traffic.**
3. Signs and paddles should be clean and readable. Always remove signs when flagging operations are not in progress.
4. Wear appropriate personal protective equipment including a safety vest and orange cap. High visibility vests or hard hats with orange covers may be required in some situations.
5. Be aware of escape routes in case of emergency and always face oncoming traffic.
6. Give clear and concise messages to drivers and coordinate with other flaggers.
7. Flaggers should be trained in flagging techniques prior to beginning a flagging operation.
8. Be aware of moving equipment in the work zone. Always establish eye contact with the operator before approaching equipment.
9. Air horns that are used to alert workers of emergency situations should be used only when absolutely necessary.

First Aid

If an injury occurs, the first aider should :

1. Evaluate the accident area to ensure he does not become involved in the same accident situation. The injured person should not be moved unless a life threatening condition exists.
(Example: A person's car catches on fire after a wreck and they could be burned up.)
2. Remain calm and take charge of the situation until professional medical help arrives.
3. Direct others briefly and clearly as to how they can help or secure help.
4. Conduct a primary survey of the victim to detect life threatening conditions that require immediate attention. These include :
 - A. **Respiratory Arrest**
 - Ensure adequate breathing by establishing and maintaining an open airway.
 - If there are no signs of breathing, give artificial breathing (mouth-to-mouth using by-pass resuscitator is preferred method).
 - If victim experiences circulatory failure, start CPR if trained to perform it.
 - B. **Severe Bleeding**
 - Determine if from capillaries, veins or arteries.
 - If artery or vein is involved, use the following methods in this order:
 - Apply direct pressure using a sterile bandage or the cleanest material available.
 - Elevate the bleeding part of the body above the head if no fractures are involved and injury will not be aggravated.
 - Apply pressure at closest available pressure point.
 - Apply a tourniquet only as a last resort and only if bleeding cannot be controlled any other way.
 - C. **Shock**
 - Be prepared to treat for shock even when there is little or no injury. First aid procedures are:
 - Keep victim lying down.
 - Provide as much fresh air as possible.
 - Loosen tight clothing at the neck, waist and chest.
 - Keep the victim warm and dry by wrapping in blankets or similar materials.
 - Do not give victim anything by mouth.
 - Help victim maintain a good positive attitude by remaining calm, using reassuring tones and keeping onlookers away.
5. Determine if transportation is necessary. Transportation of the injured person will depend on the judgement call of the first aider. In many cases, particularly with fractures, back and similar injuries, it is wiser to call the rescue squad or Emergency Medical Services for professional help. They have backboards, inflatable splints and other equipment that can be used to move the victim without causing additional injuries.

SAFE OPERATING PROCEDURES

6. Only after the life threatening injuries and medical help has been requested, should the first aider proceed to the following steps. Most of these additional steps may not be necessary if medical help can get to the site.
 - Dress any open wounds with bandage compresses, cravat bandages or any other clean materials that are available. It is only necessary for this material to last until the victim can be moved to professional medical help.
 - Splint any fractures with the best available material. Shovel handles, sticks, rolled up newspaper, etc., can be used as improvised splints.
7. When all else fails, the first aider should use his best judgement and do whatever is necessary to save the life.

Definition

- First aid is the immediate care given to a person who is injured or ill.

Principal Aims are:

- Care for life threatening conditions.
- Protection from further injury or complications.
- Arranging transportation for the victim to a medical facility.
- Making the victim as comfortable as possible while waiting for assistance.

Training Policy

- OSHA regulations require that someone in each crew be trained in first aid procedures when medical assistance is not reasonably accessible in terms of time and distance. DOT policy is to train all employees in first aid with refresher courses every three years.

Hazardous Materials

These are the responsibilities of supervisors and employees when dealing with hazardous materials.

Supervisors

1. Ensure that labels on hazardous materials are legible when the material is received and that they are maintained in a legible condition. Containers should be stored with warning labels visible.
2. Maintain the collection of Material Safety Data Sheets in a good condition and to ensure employee access as requested.
3. Provide initial and refresher training on the Hazard Communication Standard and the NCDOT's Hazard Communication Program.
4. Maintain records of employees' training.
5. Insure employees are provided with and instructed on the use of any personal protective equipment that may be necessary for working with the hazardous materials.
6. Provide proper devices and containers for transfer of hazardous material.

Employees

1. Acquire the necessary training before working with any hazardous material.
2. Review chemical labels for procedures to follow, personal or environmental hazards and safety information.
3. Acquire and wear necessary personal protective equipment before working with any hazardous material.
4. Use acceptable containers for transporting hazardous material.

Hot Weather Safety

1. Supervisors should schedule heaviest work during the cooler morning hours whenever possible.
2. All employees who have not been working in a hot environment must adjust to the heat before expecting to be fully productive (5-7 days).
3. Employees should drink 2 cups of water before beginning work. Then 2-4 additional cups should be taken during each hour of work.
4. Employees must begin drinking fluids before they feel thirsty to avoid heat related problems.
5. Employees should not take salt tablets but should get extra salt through their normal meals.
6. Light meals are better than fatty foods as they are easier on the digestive system.
7. Frequent, short breaks in the shade are better than infrequent, long ones.
8. Employees should wear the proper clothing such as loosely woven cotton shirts, sunglasses, sweatbands and the proper footwear.
9. Supervisors should insure that each crew has adequate water and that employees are allowed enough break time for drinking purposes.
10. Employees must remember that a lack of sleep, obesity, alcohol use and similar factors can increase the risk of heat related injuries.

Housekeeping and Sanitation

1. Good housekeeping is important for maintaining a safe workplace.
2. Each employee is responsible for maintaining a clean and sanitary workplace.
3. All materials must be properly stored with stock being placed neatly in racks or bins wherever possible.
4. Clear all floors and walkways of tripping hazards on a regular basis. Marked aisles must be kept clear of obstructions.
5. Maintain all floors, decks and working surfaces in non-slippery condition by removing spills as soon as possible. Any non-slip material should be inspected on a regular basis for wear.
6. Place trash in proper receptacle. Do not throw it on the floor or ground.
7. Provide a waste receptacle that is in good condition and appropriate for the type of waste material.
8. Clean all machinery regularly and keep free of shavings, excess oil and pieces of stock.
9. Oily waste, rags or other flammable material shall only be stored in the proper metal receptacles.
10. Materials should not be stored where they block access to fixed ladders, stairways, electrical switch boxes, fire fighting or other rescue equipment.
11. Hand tools should be neatly stored in a designated place.
12. Food or beverages should not be consumed in any area exposed to toxic materials or infectious agents.
13. Shields and guards will be provided on grinders, air compressors and other belt driven equipment in accordance with applicable regulations. Machines with removed or improperly functioning guards or shields shall not be operated.
14. Ample space for each employee to work safely and to achieve a sound footing shall be provided.
15. Ample light for the work to be performed will be provided.
16. Steel toe shoes shall be worn by any person while working in shop area.
17. Maintain all air, hydraulic lines and electrical cords in good repair.
18. Provide adequate fresh air flow in work area.
19. Follow proper safety procedure for use of all power tools and equipment.
20. During inclement weather, be aware of the hazards associated with wet floors.

Lifting

1. Before lifting the load, think of alternate means of moving it (push, pull, roll, pour or pump).
2. Have firm footing and make sure the standing surface is not slippery.
3. Determine the best way to hold the load using any handles, gripping areas or special lifting tools. Get a firm grip on the load.
4. Keep your back straight by tucking your chin in.
5. Tighten your stomach muscles and lift with your legs.
6. Lift the load slowly. DO NOT JERK!
7. Hold the load as close to the body as possible. Be sure you position the load close to the body before lifting.
8. Do not twist during your lift or when moving the load. Turn with your feet, not with your back.
9. Set the load down gently. Use your legs and keep your back as straight as possible.
10. Be sure your fingers are out of the way when putting the load down and when moving the load through tight spaces.
11. Don't try to be a superman. Ask for help if you need it and use mechanical means wherever it's available.

Office Safety

1. Always use proper lifting techniques or use mechanical assistance if available.
2. Never stack anything so high that it will obstruct vision.
3. Be careful of pinch points throughout the office, especially desk drawers, file cabinets and stacked materials.
4. File drawers should be closed immediately after use so no one can run into or trip over them. Only one drawer should be opened at a time to prevent cabinet from falling forward. Use caution when closing drawers.
5. Electrical cords and phone lines should be secured to prevent tripping hazards. Carpet and desk mats should be secured to prevent tripping or falling.
6. Eating, drinking or smoking should be avoided around office equipment and computer terminals. Paper clips and staples should be used with caution around copying equipment and keyboards.
7. Know where building emergency exits are located. These areas should not be used for storage or be blocked. Access ways should be kept clear at all times. Walkways within the office should be open and not restricted by stacked boxes or garbage.
8. Be aware of stress and strain associated with the use of video display terminals and create a work environment which minimizes these hazards.
9. During inclement weather, be aware of the hazards associated with wet floors. Place wet floor signs or cones at entrance ways to alert others of wet floor conditions. Door mats should be located lengthwise, inside doorways and should be inspected periodically for saturation.

Personal Protective Equipment – DMV

Data Entry Operator

Adjustable chair with arm rest
Anti-glare screen
Document holder
Foot rest
Padding for wrist protection

Law Enforcement

Equipped vehicle
Coveralls
Bulletproof vest (if issued)
Weapon
Handcuffs
Flashlight, flares
First aid kit
Safety stand/traffic cone
White gloves
Rubber gloves
Reflective vests
Baton
Whistle

Firearms Training

Ear protection
Safety glasses
Bulletproof vest (if available)
First aid kit
Radio communication

Weighing Trucks

Safety shoes
Safety glasses
Protective gloves

Motor Carrier

Chock blocks
Safety glasses
Hard hat
Breathing apparatus

Process Officer

Hand held radio

Personal Protective Equipment – DOH

The following are guidelines/requirements for the use of personal protective equipment (PPE). It is not possible to list every instance where PPE is required so it shall be the Supervisor's responsibility to exercise prudent judgement to determine if additional protective equipment is necessary and to ensure that the appropriate equipment is worn. The failure to wear appropriate PPE could result in disciplinary action.

Hard hats shall be worn:

- When there is a clear and present danger of falling objects which may cause injury.
- When exposed (or reasonably expected to be exposed) to falling or flying material.
- When exposed to overhead electrical conductors.
- At the direction of the supervisor.

Orange caps shall be worn when flagging traffic except where hard hats with orange covers shall be worn.

Safety vests or orange shirts shall be worn:

- When exposed to moving traffic or equipment.
- At the direction of the supervisor.
- When operating equipment within the right-of-way and without an enclosed cab.
- Orange shirts must be supplemented with vests for nighttime operations.
- Reflectorized vests shall be worn for all nighttime operations on the right-of way.

High visibility vests shall be worn for regular shift nighttime operations.

Safety glasses shall be worn:

- Whenever there is risk of injury to the eye such as: grinding, drilling or sawing.
- When operating various power tools or machines (e.g., weed eaters, woodworking tools, power or concrete saws, rock drills, chippers, jackhammers, etc.) which may throw particles.
- At the direction of the supervisor.
- By any person in a shop area outside of designated aisles or marked areas.
- When jump-starting a battery.

Safety goggles shall be worn:

- When their use is more appropriate than that of safety glasses (as determined by the supervisor).
- Whenever there is a need to protect the eye from dust, sawdust, and mist (e.g., during sandblasting or when using a chainsaw) which can enter or blow into an employee's eye even though he or she is wearing safety glasses.
- Whenever there is a danger of a foreign object entering through the side of the glasses.

Face shields shall be worn:

- When there is danger of splashing chemicals or other substances that may cause injury to the face or neck area (grinding, drilling, etc.).
- Whenever, in the judgement of the supervisor, their use is more appropriate than other eye protection.
- When removing or installing a battery.

SAFE OPERATING PROCEDURES

Work gloves should be worn:

- During any operation where there is a risk of abrasion, laceration, burns, blisters or puncture to the hands.

Typical Operations include:

- Hot mix paving or patching
- Tree trimming and related activities
- Handling lumber
- Sharpening tools
- Fence and guardrail repair
- Welding and grinding
- Loading or unloading tanker or distributor
- Operating chain saws, weed eaters or other gas-powered tools
- Sign repair
- Using shovels, picks, etc.

Foot protection must be worn:

- By all employees except those who do not have regular exposure to hazardous conditions (e.g., office personnel). Foot protection includes safety steel-toed shoes, toe caps, or special orthopedic steel-toed shoes and must meet ANSI Z41.1. If an employee, due to health reasons or physical abnormalities cannot wear safety steel-toed shoes then toe caps shall be worn. If an employee, due to health reasons or physical abnormalities cannot wear toe caps, then special orthopedic steel-toed shoes constructed under the supervision of a physician shall be worn. If an employee, due to health reasons or physical abnormalities, cannot wear special orthopedic steel-toed shoes, then efforts will be made to move the employee to a position with no exposure to foot hazards.

Special impermeable gloves shall be worn:

- When working with hazardous chemicals or as directed by the Material Safety Data Sheets.

Coveralls or long-sleeved shirts should be worn:

- When welding or cutting.
- When exposed to poison oak, ivy or sumac.
- When exposed to hot materials while hot mix patching or paving, crack sealing or placing thermoplastic markings.

Rubber boots shall be worn:

- When required by the Material Safety Data Sheets.
- When mixing and applying certain pesticides.

Fall protection devices (approved belt and lanyard or harness) shall be worn:

- When in the bucket of a traffic truck.
- While working on unguarded work platforms where the fall would be more than six feet.

Respirator protection shall be worn:

(filters/cartridge, supplied air, SCBA, etc.)

- When required by the product label or the Material Safety Data Sheets.
- When mixing and applying certain herbicides.
- When welding or cutting on galvanized metals.
- When determined by the supervisor.
- When spray painting.

SAFE OPERATING PROCEDURES

Hearing protection must be worn:

- Whenever the noise levels in the work environment exceed 90 dba.
(The noise level can be determined by the Loss Control Engineer)

Examples include

- Sandblasting
- Chain saws and weed eaters
- Jackhammers
- Concrete saw
- Pile drivers

All types of heavy equipment (dozers, loaders, graders, mixers, etc.) may require hearing protection. This equipment is included in the ongoing testing by the Safety Office and employees will be advised on an individual basis.

Flotation vests or life jackets shall be worn:

- When working over or near water, where the danger of drowning exists.
 - All jackets or vests shall be inspected for defects which would alter the strength of buoyancy.
 - Defective units shall not be used.
 - All jackets or vests shall be U.S. Coast Guard approved.

Clothing NOT appropriate for NCDOT use:

- Shorts
- Tank tops that expose bare shoulders
- Sandals or canvas shoes

Poisonous Snakes, Insects and Plants

Like most accidents and injuries, prevention is important in controlling hazards from poisonous snakes, insects and plants. Therefore, each employee should review the work activities planned to determine what exposures might exist. Efforts should then be made to minimize situations which might result in a snakebite, insect sting or exposure to poisonous plants. Employees should also avoid wearing bright clothes, perfumes, after-shaves, etc., to help minimize attraction of snakes or insects.

Snakes

1. Employees should wear work boots, long pants and long sleeved shirts when going into hazardous areas.
2. Employees should make as much noise as possible when approaching a possible snake area to give the snake time to leave.
3. Employees should be equipped with a bushax for clearing underbrush and for protection.
4. Employees should avoid reaching or stepping into hidden areas whenever possible.
5. If a snakebite should occur, the employee should:
 - a) Remain as calm as possible.
 - b) Move away from the snake.
 - c) Apply a constricting bandage (not tourniquet) between the wound and heart. A finger should be able to pass under it. Apply ice to bite area, if available.
 - d) Allow a fellow worker to transport him/her to closest medical facility.
 - e) If possible, kill snake and carry to medical facility for identification.
6. Under no circumstances should incisions and suction be used to treat a snakebite unless:
 - a) The victim is over 1.5 hours from medical assistance, and
 - b) The person administering first aid has received advanced training in medical assistance such as First Responder, EMT, etc.

Insect Stings

Employees should:

1. Wear appropriate clothing.
2. Avoid areas where insects might be whenever possible.
3. Schedule work in infested areas during the cool months.
4. Avoid high smelling after-shaves, colognes, etc., that may attract insects.
5. Use available insect repellents (Wasp Spray DOT # 34-02250 and Flying Insect Spray DOT#34-01825).
6. If a sting does occur, any stinger should be removed with a knife blade or fingernail. The area should then be treated with Sting Kill Swabs (DOT # 34-01850) and/or Hydrocortisone (DOT # 34-02350).

SAFE OPERATING PROCEDURES

Ticks

Ticks are especially important because of the possibility of Rocky Mountain Spotted Fever or Lyme Disease.

To minimize exposure, employees should follow these guidelines:

1. Wear appropriate clothing when working in wooded areas.
2. Check yourself at least twice a day, paying particular attention to the hair, neck and groin area.
3. Use the available Tick Repellent (DOT # 34-02050).
4. Notify your supervisor if a tick is found and request that the date and condition (i.e., attached? crawling?) be noted for future reference. (If possible, retain engorged ticks and place in a container for identification of the tick type by a NCDOT preferred provider.)
5. Call your NCDOT preferred provider if fever, chills, headaches or muscle aches develop within 3-10 days after exposure. In some cases, a rash may develop on the wrists and ankles 1-3 days after the fever begins.

Poisonous Plants

The typical NCDOT employee has exposure to at least three types of poisonous plants: poison oak, poison ivy and poison sumac. Reactions range from mild (very little or none) to severe (rash and blisters). Employees who have no reaction may not have become sensitized, but once they are, future exposures can result in an allergic reaction.

To avoid problems with poisonous plants, employees should:

1. Avoid working in severely infested areas if at all possible. (Learn what the plants look like.)
2. Wear long sleeve shirts, long pants, and work gloves. If you are performing clearing activities with either hand (e.g., bush axes, machetes, etc.) or powered tools use eye goggles/safety glasses to prevent poisonous plants from entering your eyes.
3. Use silicone protective or other barrier creams where available.
4. Use TECNU Poison Ivy Wash (NCDOT # 34-01610) on any place that may have been exposed. In some cases, even 24 hours after exposure may help.
5. Be sure that any clothes or shoes that may have been exposed receive a thorough washing. Leftover oils on anything could cause a reaction even days later.
6. If a severe reaction develops, contact your NCDOT preferred provider for possible treatments. If you do not know the name of your preferred provider, contact the Workers' Compensation clerk or Safety Officer.
7. Avoid rubbing your eyes if you have been in contact with poisonous plants.

Sun Exposure

Information for both on and off the job.

1. By far, the most common cause of skin cancer is overexposure to the sun. Ninety percent of all skin cancers occur on parts of the body that usually are not covered by clothing.
2. People who sunburn easily and have fair skin with red or blond hair are most prone to develop skin cancer. The amount of time spent in the sun also affects a person's risk of skin cancer.
3. To prevent skin cancer:
 - a. Cover up with a wide-brimmed hat and a bandanna for your neck. Wear long-sleeved shirts and pants which the sun cannot penetrate.
 - b. Use sunscreens to help prevent skin cancer as well as premature aging of your skin. Use a Sun Protective Factor (SPF) rating of 15 or higher. Women may receive added protection by using tinted opaque cosmetic foundation along with a sunscreen. Apply sunscreen at least an hour before going into the sun and again after swimming or perspiring a lot. Do not use indoor sunlamps, tanning parlors, or tanning pills.
 - c. You can still get burned on a cloudy day. Try to stay out of the direct sun at midday, because sun rays are the strongest between 10 a.m. and 3 p.m. Beware of high altitudes - where there is less atmosphere to filter out the ultraviolet rays. Skiers should remember that snow reflects the sun's rays, too.
4. Know your skin. Whatever your skin type, do a monthly self-examination of your skin to note any moles, blemishes or birthmarks. Check them once a month and if you notice any changes in size, shape or color, or if a sore does not heal, see your physician without delay.

Vehicle Operation

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of vehicle before allowing the vehicle to be operated unsupervised.
3. Drivers shall perform a pre-operational check of their vehicle. Be familiar with operator's manual.
4. No vehicle shall be operated in an unsafe condition.
5. Drivers and passengers are required to wear seat belts in state vehicles.
6. Drive defensively, observe speed limits and obey all traffic laws when operating vehicles.
7. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing.
8. Choose safest location possible to park vehicles. Avoid parking in other vehicle's blind spots.
9. Keep windshield, windshield wipers, side windows and mirrors clean.
10. Clean headlights, tail lights and emergency light covers.
11. Remove key from unattended vehicles.
12. Vehicle should not be left running when unattended. If it is necessary to leave a manual transmission vehicle running while unattended (to power warning lights, etc.), the vehicle must be properly secured with wheel chocks in front and back on the same tire.

Wet Weather

1. Area supervisors should be aware of the safety of their area and be alert to wet floor hazards.
2. Wet floor signs or cones should be placed at entrance-ways during times of inclement weather.
3. Housekeeping crews shall inspect entrances and keep water accumulations removed throughout the work day.
4. Door mats should be located inside doorways and length-way with the hall.
5. Door mats should be periodically examined for saturation.

Work Zone Safety/Traffic Control

1. Follow Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) and the North Carolina Construction and Maintenance Operations Supplement to the MUTCD.
2. For typical daytime operations, the Work Zone Safety Handbook can be used.
3. Before going to the work site:
 - a. Have a traffic control plan.
 - b. Load needed traffic control devices and check their condition.
 - c. Make sure employees have needed personal protective equipment.
4. Park in areas that:
 - a. Provide safe entrances and exits for the work area.
 - b. Do not create potential conflicts with other vehicles/equipment operating in the work area.
 - c. Provide maximum protection for workers getting in and out of the vehicles.
5. All vehicles/equipment in the work zone should be parked on the same side of the road.
6. Employees should work facing traffic. If this is not practical, a lookout should be provided.
7. Employees should be alert to the job site hazards and should identify appropriate escape routes.
8. Work zones should be inspected frequently to ensure devices are in place and that traffic is flowing adequately. When inspecting, ask yourself, "What is the driver's view?"
9. Make sure flaggers are properly trained and equipped.
10. Remove the devices in a timely manner and in a manner that provides the workers with the most protection.
11. Signs should not be left out during lunch or overnight unless necessary.
12. Police support may be useful under certain conditions. (Example: Traffic Signal Technician servicing a traffic signal.)
13. Be alert to wide or oversized loads progressing through work zones.
14. If possible, avoid working during peak hours on high volume traffic routes.
15. Do not leave equipment, such as tripods, unattended when positioned in or adjacent to travel way.

Exposure to Blood or Bodily Fluids (Bloodborne Pathogens)

Hazard Review

1. Always treat blood and bodily fluids as if they are infected with transmittable diseases.
2. Report any accident/incident involving the transfer of blood or bodily fluids to the supervisor immediately.
3. Personal Protective Equipment (PPE) will be provided and used by all employee's considered to be at risk of infection.
4. Gloves are to be worn for touching blood and bodily fluids, mucous membranes or non-intact skin of all persons, for handling items or surfaces soiled with blood or bodily fluids, and for rendering assistance to injured persons.
5. Always wash hands and arms after helping a victim. If washing facilities are not available, transport the exposed individual to a facility where soap and water are available.
6. For employees trained in CPR, separate yourself from direct contact with the victim by using a face shield or mask, or one-way resuscitating device.
7. Any items located that are believed to be human waste products (i.e., blood, soiled clothing, needles, or items identified with the universal biohazard symbol) should be handled only with personal protective equipment.
8. All items known to be contaminated with blood or bodily fluids should be disposed of in a plastic bag, along with gloves and other protective equipment used in the disposal process. This bag should then be labeled as to it's contents and a Safety Officer notified for disposal procedures.
9. All equipment and working surfaces shall be decontaminated with an appropriate disinfectant to eliminate the potential for infection.
10. NCDOT will provide a free hepatitis B vaccination for employees considered at the greatest risk of infection.
11. A copy of the exposure control plan is available by request for all employees to review.



Biohazard Symbol

This is a universal symbol identifying material or objects contaminated with human blood or bodily fluids.

Domestic and Wild Animals

Field employees are at risk from exposure to all types of animals, their waste products and their carcasses. Rodents and other animals can harbor disease-causing agents very harmful to humans. Care should be taken to avoid all wild animals and domestic animals that have the potential to harm you.

To avoid accident or injuries associated with rodents and other animals observe the following guidelines:

1. Be aware of your surroundings and note any wild or suspicious acting animals in your work area. If necessary, seek safe shelter from these animals.
2. Avoid reaching or stepping into or over hidden areas that may contain such animals.
3. When working with soil, be aware of signs that indicate above or below ground animal nests and take appropriate action to prevent contamination by dust or injury from bites.
4. Spray animal carcasses with a disinfectant (Lysol) prior to removal and wear rubber gloves to remove animal carcasses. Dispose of dead animals in compliance with applicable county health guidelines. Wash exposed skin with an antibacterial or disinfectant soap (i.e., Dial or Dermascrub) after removal and disposal of the animal.
5. If an animal bite occurs, clean the wound with soap and water, and follow appropriate first aid procedures. Immediately report the incident to your supervisor.
6. Transport any bite victim to the NCDOT preferred provider located in your Division/area. (If possible, safely capture or kill the animal so it can be tested for any known disease-causing agents.)
7. If exposure to airborne particles and dust from a nest does occur, immediately report the incident to your supervisor. (If possible, and without exposing yourself, mark the site without disturbing it so trained personnel can collect samples to determine if any disease-causing agents are present.)
8. Avoid direct contact with bird, bat and other animal droppings. Areas where birds and bats roost should be avoided or appropriate respiratory protection shall be used.
9. Avoid direct contact with animal blood. Wear rubber gloves if contact with animal blood can not be prevented. Dispose of rubber gloves properly. Wash hands thoroughly with an antibacterial soap after disposal of rubber gloves and before eating, drinking or smoking.

Abrasive and Waterblast Cleaning

Hazard Review

Noise	Debris Hazard to Eyes and Uncovered Skin	Pinching and Cutting
Crushing	Caustic or Volatile Hydrocarbon Liquids	Burns
Noxious or Irritating Fumes	Moving Equipment	High Pressure Air or Liquids
Slip, Trip and Fall	Lifting	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks
2. Determine safe routing for electrical cords, air lines and hoses to prevent tripping hazards and unnecessary exposure to ruptured lines.
3. Wear appropriate personal protective equipment including long sleeve shirts and gloves.
4. Shield work area or exclude unprotected personnel from air or water-borne debris.

Related SOPs

General SOPs	Chapter 10	Hazardous Waste Handling and Storage	11E-4
Crane/Dragline.....	12A-4	Forklift	12A-6

Boiler Operations

Hazard Review

Noise	Flying Debris	Moving Equipment
Noxious Fumes	Lifting	Confined Spaces
Slip, Trip and Fall	High Temperatures	Flying Objects
Dark Work Areas	Flammable Materials	Rotating Machinery
High Pressures	Pinch Points	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operating checks.
2. Wear appropriate personal equipment consistent with the hazard.
3. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate these conditions.
4. Determine routing for electrical cords and equipment lines to avoid tripping hazards.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Ensure adequate ventilation.
7. Be aware of first aid kit, fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce risk of fires, slipping and tripping.
8. Ensure ready access to and operating conditions of eye washers and emergency showers in case of exposure to skin and eye irritants.
9. Be particularly aware of wet stains on insulation, piping and associated joints that may indicate a small leak that could become a major steam leak.
10. Correct fuel leaks immediately, securing boilers or other heat sources as appropriate.

Related SOPs

General SOPsChapter 10	Electrical Installation/Repairs11A-4
Hydraulic System Repairs11A-10	Maintenance and Repair Shops (General).....11A-21
Mechanic Operations.....11A-22	Confined Space Entry11E-1
Lockout/Tagout.....11E-7	

Dyno Room

Hazard Review

Noise	Debris Hazard to Eyes and Uncovered Skin	Lifting Heavy Objects
Noxious Fumes	Slip, Trip and Fall	Flying Objects
High Temperatures	High Pressures	Rotating Machinery

1. Review Safe Operating Procedures for applicable equipment and perform pre-operating checks.
2. Wear appropriate personal protective equipment consistent with the hazard.
3. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate these conditions.
4. Determine routing for electrical cords and equipment lines to avoid tripping hazards.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Inspect chains, hoist and lift rings prior to use.
7. Ensure engine is securely mounted and all connections are secure prior to start-up.
8. Ensure adequate ventilation when equipment is operating.
9. When tests are in progress, stay in operating booth and prevent entry by others to test area.

Related SOPs

General SOPs	Chapter 10	Electrical Installation/Repairs	11A-4
Hydraulic System Repairs	11A-10	Maintenance and Repair Shops (General).....	11A-21
Mechanic Operations.....	11A-22	Lockout/Tagout.....	11E-7
Fuel and Lube Truck.....	12A-32		

Electrical Installation/Repairs

Hazard Review

Electrical Shock	Overhead Loads	Confined Space
Slip, Trip and Fall	Poisonous Plants/Snakes/Insects	Lifting
Crushing or Pinching Injuries	Moving Traffic and Equipment	

1. Do not attempt to make any electrical repairs unless qualified or properly supervised.
2. Review Safe Operating Procedures for job required.
3. Review plans to determine electrical hazards and ways to protect operators.
4. Locate all utilities in and near the work site.
5. Evaluate site and follow excavation and trenching guidelines.
6. Avoid walking and working under suspended loads.
7. Use proper lifting or pulling techniques. Get help or use equipment if necessary.
8. Be aware of crushing or pinching hazards in jointing pipe and conduit.
9. Rubber boots may be needed in wet ditches.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Employees must use extreme caution to stay clear of moving equipment.
12. Establish eye contact with operator before approaching equipment.
13. Use proper tools for the work required.
14. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
15. Allow ample work space for each employee.
16. Park in areas that provide safe entrance and exit of work areas.
17. Locate and use all electrical lockout devices and tags properly.
18. Locate all fire extinguisher and first aid kits at each job site.

Related SOPs

General SOPsChapter 10	Ferry Marine Maintenance Facility–Power Building..11A-7
Traffic Services' Shops and Warehouse..... 11A-37	Roadway Lighting Installation/Maintenance11B-64
Traffic Signal Installation/Maintenance 11B-76	Lockout/Tagout.....11E-7
Aerial Device Truck.....12A-26	Generator.....12B-12
Hand Tools (Power and Manual)12B-13	Ladder.....12B-15

Equipment/Automotive Painting

Hazard Review

Noxious Fumes	High Pressures	Skin Disorders
Fire	Hazardous Chemicals and Solvents	

1. Review Safe Operating Procedures for applicable equipment and materials safety data sheets for recommended safe handling of materials to be used. Make sure that MSDSs are readily accessible to work area.
2. In case of spills or leaks, secure ignition sources. Scoop materials into proper containers for disposal. Keep on hand inert absorbent aid, such as oil dry or rags.
3. Store dirty rags in properly marked containers. Minimize trash build-up. Empty containers frequently.
4. Dispose of waste in appropriate containers and in accordance with federal, state and local regulations.
5. Store paints and other flammable materials in appropriate cabinets or containers. Keep away from heat and provide adequate ventilation. Open only enough materials and supplies to perform job at hand.
6. Wear appropriate personal protective equipment. The use of over garments, gloves, creams, etc. is recommended to reduce damage to skin. Eye protection is required.
7. Know overexposure effects and emergency first aid procedures.
8. Ensure that safety equipment is within reach and in proper working order. Eyewasher, fire extinguishers and a first-aid kit must also be available.
9. Use only proper equipment and maintain it in accordance with recommended procedures.
10. Assure that fittings and connections are kept tight and that air hoses and pressure hoses aren't frayed or leaking. Ensure that air pressure is regulated, applying only enough pressure to operate the equipment being utilized such as spray gun, pressure pot spray apparatus, sanders and grinders.
11. Maintain proper exhaust and air flow within spray booth; monitor air flow meters.
12. Ensure that all spray booth safety features are operable and that spray booth warning bell is functional.
13. Keep exhaust filters changed as required or necessary. Keep paint overspray build-up to a minimum by frequently changing paper on spray booth floor. Keep filters on inlet side of booth changed.
14. Use only properly fitted, approved respirators. When using a positive pressure air supplied respirator, assure that hood and hoses are free of tears and breaks and that air pump inlet filter is frequently inspected and changed as needed.
15. Maintain proper warning signs in the paint shop. Signs informing of paint spraying operations, flammability dangers, no smoking and no open flames should be located both inside as well as outside the paint area. "No parking" signs should be posted and enforced at the entrance and exit to ensure they are not blocked.
16. When working alone in the spray booth, there should be another worker nearby to provide assistance in the event of an emergency.

Related SOPs

General SOPs	Chapter 10	Equipment Body Repair	11A-6
Maintenance and Repair Shops (General)	11A-21	Mechanic Operations	11A-22
Chemical/High Pressure Wash Metal Cleaning .	11A-23	Mechanical/Abrasive Metal Cleaning.....	11A-24
Sandblasting.....	11A-32	Shipyard Painting	11A-35
Ferry Field Maintenance.....	11B-30	Structural Steel Painting.....	11B-72
Confined Space Entry.....	11E-1	Hazardous Waste Handling and Storage	11E-4

Equipment Body Repair

Hazard Review

Toxic Fumes	Cuts and Pinch Points	Solvents
Reactive Materials	Slip, Trip and Fall	

1. Review safe operating procedures for applicable equipment.
2. Review Materials Safety Data Sheets for material to be used.
3. In the event of spills, extinguish all sources of flame and ignition, absorb with inert material such as vermiculite or sand, sweep up and collect in container for disposal as solid waste.
4. Extinguish open flames when using plastic body fillers.
5. Thoroughly wash any skin with soap and water that has been exposed to harmful solvents or other materials.
6. Use safety glasses, face shields and respiratory equipment as required.
7. Assure ventilation adequate to draw dust and fumes away from work area.
8. Dispose of waste and scrap in accordance with policy and regulations.
9. Take special precautions to avoid cuts to hands and fingers caused by burrs and sharp edges on metal parts.
10. Assure shields and guards are in place on all machinery.
11. Use only approved jacks and jack stands and assure they are rated for the load to be lifted.
12. Maintain a neat, clean and orderly work place.
13. Never use unknown or outdated chemicals or materials.
14. Assure any electrical or mechanical equipment is in good repair.
15. Report all malfunctioning equipment to supervisor.
16. Proper lifting techniques shall be used. Get help or use equipment if necessary.

Related SOPs

General SOPsChapter 10	Hoisting/Jacking 11A-9
Maintenance and Repair Shops (General) 11A-21	Mechanic Operations 11A-22
Chemical/High Pressure Wash Metal Cleaning . 11A-23	Mechanical/Abrasive Metal Cleaning..... 11A-24
Forming and Shearing Metal Punching 11A-25	Oxy-Acetylene Cutting/Welding 11A-27
Sandblasting..... 11A-32	Hand Tools (Power and Manual) 12B-13

Ferry Marine Maintenance Facility - Power Building

Hazards Review

Noise	Temperature Extremes	Electrical Shock
Hot Surfaces	Moving Machinery Parts	Slip, Trip and Fall
Fire	Hazardous Materials	Pressurized Systems

1. Wear appropriate personal protective equipment consistent with the hazard. Eye protection, rubber gloves and apron shall be worn when working on batteries.
2. Take extra precautions to prevent heat stress when working in extremely hot temperatures. Leave building if necessary. Drink plenty of fluids.
3. Always stand on rubber padding when working around electrical transfer and monitoring systems. Keep floors dry, especially near electrical equipment.
4. Be alert for sprayed fuel, lube oil, or engine cooling water from pressurized systems. In case of fire, shut off equipment immediately. If conditions permit, shift power to another generator. Activate fire alarm system.
5. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
6. Avoid contact with engine manifolds, turbines, piping, etc., which build up high temperatures that can cause severe burns.
7. Standby diesel generators and air compressors start and stop automatically; stay clear unless the equipment is de-energized, locked and tagged out.
8. Periodically observe all equipment for malfunctions, and be alert for loose electrical connections which may be indicated by spattering (hissing) noises, arcing and burn marks.
9. Equipment shall be operated in a safe manner as established in applicable training programs and manufacturer's guidelines.
10. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate them.
11. Review MSDS for each chemical used.

Related SOPs

General SOPsChapter 10	Electrical Installation/Repairs 11A-4
Ferry Operations 11B-31	Confined Space Entry 11E-1
Hazardous Waste Handling and Storage 11E-4	High Pressure Hoses 11E-5
Lockout/Tagout 11E-7	Rigging 11E-8
Hand Tools (Power and Manual) 12B-13	

Glass Cutting

Hazard Review

Pinch Points	Flying Particles	Punctures
Slip, Trip and Fall	Cuts and Abrasions	Broken Glass

1. Wear proper personal protective equipment consistent with the hazard.
2. Be aware of first aid kit locations and check routinely to make sure they are complete.
3. Use proper lifting and handling techniques. When required, use overhead cranes, forklifts or another person.
4. Do not wear loose fitting clothes or neckties.
5. Before beginning a job, ensure a neat orderly workspace with sufficient clearance for handling raw material, finished goods and scrap.
6. Be aware of loose or slippery materials and other obstructions. Take appropriate measures to eliminate them.
7. Practice good housekeeping techniques, keeping the area clear of broken materials that present safety hazards.
8. Be certain materials are stored properly to prevent damage and avoid safety hazards.
9. Be certain materials are positioned properly before performing and working or cutting operations.
10. Use appropriate glass handling devices when positioning glass in frames.

Related SOPs

General SOPsChapter 10	Maintenance and Repair Shops (General).....11A-21
Mechanic Operations.....11A-22	Ferry Field Maintenance11B-30
Ferry Shore Facilities.....11B-32	Hand Tools (Power and Manual)12B-13

Hose Crimp Machine

Hazard Review

Cuts, Bruises and Blisters	Eye Injury	Pinching and Crushing Injuries
High Pressure Fluid	Electrical Shock Hazard	

1. Make sure work area is clean and clear of all hazards.
2. Ensure machine is oiled and that regular preventative maintenance is performed.
3. Wear eye protection.
4. Keep hands out from under ram at all times.
5. Wear leather gloves when using skiving tools.
6. Keep bottom of die-cage clean.
7. Never re-use any component. Use new components (i.e., hoses, ferrules and stems).
8. Use a magnet to insert proper die halves, one at a time, into base ring.
9. Ensure proper setting of Digital Readout Pressure.
10. Use proper die and hose assembly components.

Related SOPs

General SOPs	Chapter 10	Hydraulic System Repairs.....	11A-10
Forming and Seaming Metal Punching	11A-25	High Pressure Hoses	11E-5
Lockout-Tagout.....	11E-7	Maintenance and Repair Shops (General).....	11A-21
Roadside Equipment Repair	11B-62	Hand Tools (Power and Manual).....	12B-13

Hoisting/Jacking

Hazard Review

Crushing Injuries

Slip, Trip and Fall

Back Injuries

1. Use proper safe lifting techniques.
2. Ensure chain hoist or jack is rated for weight being lifted. Operate with safe limits.
3. Assure hoist dollies and beams are rated correctly for shop use and are properly maintained.
4. Assure that the hoist chain and hook are within the allowed wear tolerance as required by OSHA and that the hook is in compliance with a safety latch.
5. Use an approved web or chain sling to hold load.
6. Never get under load being raised or suspended.
7. Assure that area around lift is clear of personnel and obstacles.
8. Ensure that a floor lift is safe to operate and properly maintained.
9. Place vehicles on lift using proper procedures to locate lift brackets under vehicle.
10. Closely monitor vehicle as it is being raised and assure that it is stable on lift.
11. Lock safety rod into place under lift to prevent the lift from leaking down.
12. When lowering lift, assure that area around lift is clear and safety rod is removed. When lift is down, properly secure all lift brackets.
13. Move vehicle from lift area when completed.
14. After the vehicle is raised, place garage stands under the vehicle to provide safe support. Never depend on the floor jack to hold up the load.
15. When work is complete, remove stands, lower the floor jack and secure it in the designated storage area.
16. Block wheels when using above ground lift or when only one end of a vehicle is being lifted.

Related SOPs

General SOPs	Chapter 10	Equipment Body Repair	11A-6
Maintenance and Repair Shops (General)	11A-21	Mechanic Operations	11A-22
Tire Repair	11A-36	Bridge Jacking	11B-11
Ferry Shore Facilities.....	11B-32	Roadside Equipment Repair.....	11B-62
Rigging.....	11E-8	Wrecker	12A-38
Hand Tools (Power and Manual)	12B-13		

Hydraulic System Repairs

Hazard Review

High Pressures	Slip, Trip and Fall	High Temperatures
Skin Abrasions	Crushing Injuries	Infection From Oil Penetration
Lifting		

1. Never begin work on a hydraulic system until fully trained.
2. Carefully review the manuals on equipment before beginning work. Ask questions about anything you do not fully understand.
3. Maintain a clean work area free of slipping hazards and debris.
4. Use all required safety equipment.
5. Always use safety glasses.
6. Block, secure or lower to the ground all components that may move, rotate or fall.
7. Relieve system pressures. (Note: Some systems use accumulators that store pressure. Identify the system before working on it.)
8. Use extreme caution when disconnecting hydraulic lines. Severe burns from hot fluid can result.
9. Use test equipment designed for higher pressures than the system being repaired. Use of gauges, lines, connectors, etc., designed for lower pressures can result in bursting or equipment damage. Start with high pressure gauges and work down. (Note: A good rule is to use equipment rated at twice what is expected. Example: For a 2500 psi system, use a 5000 psi gauge.)
10. DO NOT USE HANDS OR FINGERS to find leaks. Fluid under high pressure can be injected into skin causing extreme injury and serious infection
11. Clean up spills immediately. Hydraulic fluid is an oily substance which can cause slipping, falling and resulting injuries.
12. Do not work under equipment/apparatus being supported by hydraulics. Stops, safety pins, etc. must be in place prior to beginning repairs.
13. Review MSDSs for all chemicals used.

Related SOPs

General SOPsChapter 10	Hoisting/Jacking11A-9
Maintenance and Repair Shops (General)11A-21	Mechanic Operations11A-22
Ferry Engineering11B-29	Ferry Field Maintenance11B-30
Ferry Operations.....11B-31	Ferry Shore Facilities11B-32
Roadside Equipment Repair11B-62	High Pressure Hoses11E-5

Lifting/Fleeting Vessels

Hazard Review

Moving Machinery Parts	Slip, Trip and Fall	Lifting
Moving Equipment	Suspended Loads	Material Under Stress
Crushing Injuries	Adverse Weather Conditions	Drowning/Hypothermia

1. Wear appropriate personal protective equipment consistent with the hazard, including life vests, hard hats, safety glasses, gloves and safety shoes. Ensure that life rings are readily available.
2. Stay clear of all open gears, cables and moving equipment.
3. Never use more than two turns on the capstan. Do not use excessive pull and keep clear of loose ends and bights in rope.
4. Be aware of loose objects, slippery deck, tripping hazards and uneven docking.
5. Always use signalman with crane, loader and forklift. **ONLY LICENSED PERSONNEL SHALL OPERATE THIS EQUIPMENT.**
6. All operations shall be under the direction of the Dockmaster, who shall ensure that the Synchronlift is in a safe operating condition.
7. Warning sirens will be sounded prior to Synchronlift operation. Employees shall stand clear of winches and platform when alarm sounds.
8. Use proper lifting techniques when positioning blocks.
9. No unauthorized person shall be allowed in lift house during operation.

Related SOPs

General SOPs	Chapter 10	Maintenance and Repair Shops (General).....	11A-21
Rigging.....	11E-8	Crane/Dragline	12A-4
Forklift.....	12A-6		

Loading/Unloading Freight

Hazard Review

Lifting	Slip, Trip and Fall	Heat Stress
Crushing Injuries		

1. Ensure that all trucks or trailers are securely chocked prior to entering with a forklift.
2. Ensure that the hydraulic dock levelers are properly positioned on the bed of the trailer to allow for safe entry.
3. Forklift speeds must be at a minimum to avoid damage to trailers and material. When ramps are wet or icy, special attention is required to avoid slipping or sliding.
4. Care must be taken to avoid hitting pedestrians who may be in the work area.
5. When loading trailers, ensure that all pallets are secured with stretch wrap and properly loaded to avoid shifting while being transported. Use chains or straps to guard against shifting.
6. All heavy pallets should be placed in the front of the trailer to avoid being thrown forward during quick stops.
7. All hazardous material must be properly marked and placards displayed on the trailer to indicate hazardous contents.
8. All forklift operators must be qualified and approved prior to loading or unloading any trailers.
9. Do not load pallets or handtrucks in a manner that blocks vision when moving loads.

Related SOPs

General SOPs	Chapter 10	Warehouse.....	11A-39
Forklift.....	12A-6	Tractor Truck and Trailer	12A-36

M&T Unit – Aggregate Gradations

Hazard Review

Lifting	Hot Materials	Noise
Cuts	Crushing Injuries	Dust
Slip, Trip and Fall		

1. Use proper lifting techniques.
2. Wear proper foot-wear and other personal protective equipment as required.
3. Be aware of possible sharp edges when removing trays from Gilson shaker.
4. Be aware of hot surfaces when placing samples in and removing samples from oven.
5. Wear heat-resistant gloves when removing samples from oven.
6. Use proper ventilation.
7. Be aware of loose objects or aggregate on floor.

Related SOPs

General SOPsChapter 10 Sampling and Inspection at Producer's Facility.....11B-65

M&T Unit – Bituminous Testing

Hazard Review

Lifting	Fumes	Cuts
Hot Materials	Splashes	Slip, Trip and Fall
Burns	Crushing Injuries	

1. Use proper lifting techniques.
2. Wear proper foot-wear and other personal protective equipment as required.
3. Wear heat-resistant gloves when handling hot materials.
4. Be aware of hot surfaces when placing samples in and removing samples from oven.
5. Use tongs to handle hot crucibles in ash correction.
6. Wear rubber gloves when pouring solvents, when placing specimens in hot water and when agitating Ash Correction samples.
7. Use proper eye and/or face protection when pouring materials, mixing ingredients and agitating samples and when around Abson Recovery distillation apparatus.
8. Maintain proper temperature per AASHTO test procedure for Abson Recovery.
9. Use proper ventilation when pouring, evaporating and burning Ash Correction samples and in all distillation or extraction areas.
10. Secure lids before agitating Ash Correction sample.
11. Check to see that gas is off before using any ignition device.
12. Be alert to moving parts of equipment that could injure hands.
13. Maintain a dry floor surface in area of gravity apparatus.
14. Before moving any TRICO barrels, check to see that all openings are closed.
15. Observe all Still Operating Procedures.
16. Wear film badge when working with nuclear asphalt content gauge.
17. Review MSDSs for TRICO, Asphalt Cement, etc.

Related SOPs

General SOPs	Chapter 10	Asphalt Field Laboratory	11B-2
Sampling and Inspection at Producer's Facility..	11B-65		

M&T Unit – Chemical Testing

Hazard Review

Cuts	Fumes	Flying Particles
Chemical Burns	Crushing Injuries	Splashing Chemicals
Hot Materials	Puncture Injuries	Chemical Reactions
Poisoning	X-Ray Exposure	Lifting

1. Use proper lifting techniques.
2. Wear proper footwear.
3. Wear protective clothing such as lab coats and aprons.
4. Wear gloves when working with asphalt, when cutting with knives and when cutting wires and other metal articles.
5. Shield ends of wires and rods to prevent them from being propelled across room when cut.
6. When using knives, cut away from body. When breaking glass rods or tubing, hold with rags or use gloves and break away from body.
7. Wear heat resistant gloves when placing samples in and removing samples from oven.
8. Wear solvent proof gloves when cleaning apparatus with solvent.
9. Wear eye protection when boiling samples on hot plates, when opening muffle furnace and ovens, when cutting wires and other metal articles, when pressing pellets, when cutting glass rods and in designated areas.
10. Use proper ventilation when using solvents.
11. Keep flammable solvents away from open flames and electric sparks.
12. Be sure knives and cutters are sharp and in good working order. Check all glassware for cracks and chips and discard damaged glassware.
13. When pressing pellets, check press for leaks in hydraulic system and be sure items being pressed are set flush under press.
14. When distilling liquid samples in glass stills, be sure shield is around still and lids are in place over shield.
15. When running impact test on pipe coating, be sure fingers are clear of impact hammer.
16. When using instruments, be sure cylinders of compressed gas are properly secured, check fittings for gas leaks, do not use lubricant on fittings, be sure burner heads are safely secured and have cooled before handling, and be aware of sharp needles when injecting GC samples.
17. When using autoclave, do not overfill and be sure temperature is down to safe level and open carefully, being aware of escaping steam.
18. When saybolt tubes are being cleaned with solvent, be sure to keep lids on tubes.
19. Wear film badges when working with x-ray equipment.
20. Do not leave unattended beakers on hot plates or burners.
21. Be familiar with the MSDSs for reagent or solvent in use.
22. Transport jugs of reagents in appropriate rubber containers.
23. Know location of safety showers and eye wash.

SAFE OPERATING PROCEDURES

24. Be sure all reagents are properly labeled. If a bottle is relabeled, old label should be completely removed before adding new one. Do not try to identify unknown by smelling or tasting.
25. Check reagents for dates and properly dispose of outdated chemicals.
26. Do not mouth pipet liquids.
27. Do not eat or drink in designated working areas.
28. Before operating instruments and equipment, verify safety shields and guards are in place and effectively operating.

Related SOPs

General SOPsChapter 10 Sampling and Inspection at Producer's Facility.....11B-65

M&T Unit – Physical Testing

Hazard Review

Lifting	Flying Objects	Fumes
Slip, Trip and Fall	Pinching Injuries	Dust
Cuts	Noise	Chemical Burns
Crushing Injuries	Burns	UV Light

1. Use proper lifting techniques.
2. Wear proper footwear and other personal protective equipment as required.
3. Wear eye protection when sawing pipe, drilling cylinders for calcium nitrite, spraying curing compound, mixing mortar, testing cubes, using bolt cutter and during L.A. machine operations.
4. Keep body parts and clothing clear of moving parts of equipment.
5. Wear hearing protection when drilling cylinders for calcium nitrite, when charging or discharging L.A. machine and when in L.A. room with L.A. machine in operation.
6. Be sure that protective shield is in place when performing compression tests and tensile tests and stand clear of machine during test.
7. Be sure ladder is secure before climbing and do not lean over rails.
8. Be aware of sharp ends and edges of samples and sign panels.
9. Keep fingers and hands clear of cutting edge of bolt cutter and knife edges of rubber slicer.
10. Be aware of potential falls and trips while performing rotational capacity tests on bolts. Sudden breakage of bolts may occur.
11. Avoid slips and falls from wet floor caused by dripping water from blocks, bricks and stone during absorption test.
12. Do not open weatherometer while it is in operation due to possible exposure to high temperature, acid-water spray and ultraviolet light.
13. Wear heat resistant gloves when placing samples in and removing samples from ovens and curing cabinet and when handling hot samples.
14. Wear chemical resistant gloves when immersing and retrieving samples in sodium sulfate solution and handling glasswear exposed to acid.
15. Wear rubber gloves when handling cement, lime, mortar, grout, epoxy, fly ash, slag and rapid repair materials.
16. Wear dust mask when splitting, pouring or scooping dry cementitious and other fine materials and during L.A. machine operations.
17. Use exhaust fan when mixing mortar.
18. Use respirator when spraying curing compound and when exposed to acid cleaning solutions.
19. Read warning labels on all commercial grouts, rapid repair materials and epoxies. Take appropriate precautions to avoid toxic fumes, corrosive materials and other hazards.

Related SOPs

General SOPs	Chapter 10	Hand Tools (Power and Manual)	12B-13
Ladder.....	12B-15		

M&T Unit – Preparing Samples for Physical Testing

Hazard Review

Lifting	Slip, Trip and Fall	Crushing Injuries
Cuts	Noise	Electrical Shock
Flying Particles	Dust	Toxic Fumes
Splashing Molten Sulphur		

1. Use proper lifting techniques.
2. Wear proper footwear and other personal protective equipment as required.
3. Wear eye protection when sawing, chiseling, breaking bricks or using mechanical splitter.
4. Wear face shield and gloves when capping with molten sulphur.
5. Wear hearing protection and ensure proper ventilation when sawing.
6. Be aware of crushing hazards of dropping materials and using hammer and chisel.
7. Utilize blade guard and shield on saws.
8. Utilize exhaust fan when capping with molten sulphur.
9. Keep body parts and clothing clear of circular saw.
10. Do not attempt to manually support loads to be sawed.
11. Wear rubber suit when sawing cores or cylinders.
12. Stand on rubber mat when saw is in operation.
13. Maintain dry floor surface in area of bituminous core gravity apparatus.
14. Wait until fog clears before entering moist room.
15. Use caution when walking on wet floor of moist room.
16. Balance all cylinders and cores securely on push cart and in stacks. Do not stack more than two high.

Related SOPs

General SOPsChapter 10 Hand Tools (Power and Manual)12B-13

M&T Unit – Receiving Samples

Hazards Review

Lifting	Cuts	Spillage
Dropping Objects	Slip, Trip and Fall	Flying Particles

1. Use proper lifting techniques and obtain assistance if necessary.
2. Check metal ties on bags for exposed ends and remove ties carefully.
3. Check containers for loose lids and caps and bags for torn places that might rupture.
4. Check samples for sharp points or edges, such as barbed wire points and slivers on reinforcing bars.
5. Wear appropriate personal protection equipment consistent with the hazard, such as safety shoes, safety gloves and safety glasses.
6. Be aware of loose objects, loose aggregate, uneven floor and other environmental hazards.

Related SOPs

General SOPsChapter 10

M&T Unit – Soils Testing

Hazard Review

Lifting	Cuts	Compressed Air
Burns	Slip, Trip and Fall	Pressurized Hoses
Flying Particles	Crushing Injuries	Hot Materials
Dust	Noise	Pinching Injuries

1. Use proper lifting techniques.
2. Wear proper footwear and other personal protective equipment as required.
3. Wear safety glasses when using compressed air and do not place compressed air nozzle against skin.
4. Gloves, dust masks and hearing protection are to be used when hazard warrants.
5. Be aware of hot surfaces when placing samples in and removing samples from oven.
6. Wear heat-resistant gloves when handling hot materials.
7. Use tongs when removing samples from oven.
8. Be aware of crushing hazards of dropping materials.
9. Be alert to moving parts of equipment that could injure hands.
10. Use safety latch on compactor when placing mold on and removing mold from compactor.
11. Grasp molds and triaxial cells with both hands when moving items.
12. Hold rammer approximately two inches below top of cylinder casing while pulling hammer with other hand.
13. Unplug mixer before changing blade.
14. Be sure to allow enough clearance when placing glass cylinders in water bath and when removing them from water bath so the cylinder does not hit edge of water bath.
15. Be aware of loose objects or aggregate on floor.
16. Maintain a dry floor surface in soil mechanics section.
17. Stack bags of material on cart in a balanced and secure pattern.
18. Be alert to possible splinters from shelves when placing or removing samples on shelves in drying room.

Related SOPs

General SOPs	Chapter 10	Air Compressor.....	12B-1
Hand Tools (Power and Manual)	12B-13		

Maintenance and Repair Shops (General)

Hazard Review

Hazardous Materials	Slip, Trip and Fall	Sharp Edged Tools
Moving Equipment	Improperly Stacked Material	Noise
Flammable Materials	Confined Spaces	High Pressure Hoses
Dark Work Areas	Electrical Shock	Lifting
Pinch Points	Pressurized Containers	Sparking

1. Wear personal protective equipment consistent with the hazard.
2. Be aware of the wide variety of chemicals, cleaning agents, degreasers, paints thinners and other combustible materials used in the shops. Read and follow warning labels on containers and on MSDSs, to ensure materials are handled and stored properly.
3. Be familiar with the Facility Contingency Plan. Notify the supervisor if a hazardous substance is spilled. Follow proper procedure for clean up.
4. Be aware of first aid kit, fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
5. Material handling equipment (forklifts, cranes, etc.) shall be operated in a safe manner, as established in applicable training programs and manufacturer's guideline. Pedestrians should be alert for moving equipment within and adjacent to shops.
6. Proper lifting techniques shall be used. Get help or use lifting equipment if necessary.
7. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate these conditions.
8. Determine routing for electrical cords and equipment lines to avoid tripping hazards.
9. Ensure adequate ventilation.
10. Ensure ready access to and operating conditions of eye washers and emergency showers in case of exposure to skin and eye irritants.

Related SOPs

General SOPsChapter 10	Dyno Room.....11A-3
Equipment/Automotive Painting.....11A-5	Equipment Body Repair11A-6
Hoisting/Jacking.....11A-9	Hydraulic System Repairs.....11A-10
Lifting/Fleeting Vessels.....11A-11	Oxy-Acetylene Cutting/Welding.....11A-27
Tire Repair11A-36	Arc Welding11A-40
Ferry Engineering11B-29	Ferry Field Maintenance11B-30
Ferry Operations.....11B-31	Confined Space Entry11E-1
High Pressure Hoses.....11E-5	Forklift.....12A-6
Hand Tools (Power and Manual)12B-13	

Mechanic Operations

Hazard Review

Cuts, Bruises and Blisters	Flying Metal Particles	Pinching and Crushing Injuries
Lifting	Eye Injury	

1. Make sure work area is clean and clear of all hazards.
2. Clean up spills as soon as they happen.
3. Use and keep in good shape all applicable safety equipment.
4. Use caution when moving equipment into or out of a shop. Use a spotter when necessary.
5. Locate such items as fire extinguishers and eye wash stations so you can find them in the event of an emergency.
6. Use lock-out tag-out on equipment that is not to be started or moved.
7. Always use the proper tools for the job. See your supervisor for any special tools.
8. Inspect drop cords routinely. See your supervisor for repair or replacement if needed.
9. Always use OSHA approved chains or slings and inspect before use.
10. Make sure hoist is in good operating condition. Report any defects to your supervisor or safety officer.
11. Use extreme caution when working around cranes. Use proper hand signals so you can communicate with the operator.
12. Do not get under any object being lifted by crane or hoist.
13. Do not charge batteries within 18" of floor.
14. Always inspect the area around you to make sure you have a clear path so you can get out of the way in an emergency.
15. Never get under any equipment supported only by a jack. Always use the proper stands.
16. Make sure the full weight is resting on the stand and the equipment is secure.
17. Use only jacks that are in good condition and proper tonnage for your application. Report any defective jack or stands to your supervisor. Do not use them.
18. Use personal protective equipment.
19. No smoking in shop or while repairing equipment.

Related SOPs

General SOPs	Chapter 10	Dyno Room.....	11A-3
Equipment/Automotive Painting	11A-5	Equipment Body Repair	11A-6
Hydraulic System Repairs	11A-10	Maintenance and Repair Shops (General).....	11A-21
Chemical/High Pressure Wash Metal Cleaning.....	11A-23	Mechanical/Abrasive Metal Cleaning.....	11A-24
Forming and Shearing Metal Punching	11A-25	Metal Removing by Machine.....	11A-26
Oxy-Acetylene Cutting/Welding	11A-27	Tire Repair	11A-36
Arc Welding.....	11A-40	Roadside Equipment Repair	11B-62
Towing Disabled Equipment	11B-75	Confined Space Entry	11E-1
High Pressure Hoses.....	11E-5	Jump Starting.....	11E-6
Lockout/Tagout.....	11E-7	Rigging.....	11E-8
Forklift.....	12A-6	Wrecker	12A-38
Air Compressor.....	12B-1	Hand Tools (Power and Manual)	12B-13

Chemical/High Pressure Wash Metal Cleaning

Hazard Review

Noise	Debris Hazard To Eyes and Uncovered Skin	Pinching & Cutting
Caustic or Volatile Hydrocarbon Liquids	Lifting	Noxious or Irritating Fumes
Crushing Injuries	High Pressure Air or Liquids	Burns
Moving Equipment	Slip, Trip and Fall	

1. Review Safe Operating Procedures for applicable equipment and perform pre - operational checks.
2. Ensure ready access to and operating conditions of eye washers and emergency showers in case of exposure to cleaning materials.
3. Determine safe routing of hoses to prevent tripping hazards and unnecessary exposure to ruptured hoses or leaking fittings.
4. Wear appropriate personal protective equipment including long sleeve shirts and gloves, aprons and face shields or goggles as required.
5. Minimize splashing of caustic solvents in dip tanks. Cover vats for cleaning cycle.
6. Ensure fire hazards are minimized when using volatile hydrocarbon degreasers. Know the location of and ensure access to fire fighting equipment.
7. Ensure adequate ventilation when cleaning vats are within buildings.
8. Proper lifting techniques shall be used. Get help or use lifting/handling equipment if necessary.
9. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate these conditions.
10. Ensure adequate rinsing or air drying of cleaned material prior to unprotected handling.
11. Hazardous wastes and cleaning chemicals are to be stored and disposed of only in accordance with approved procedures.

Related SOPs

General SOPs	Chapter 10	Hazardous Waste Handling and Storage	11E-4
Forklift.....	12A-6	Power Washer.....	12B-20

Mechanical/Abrasive Metal Cleaning

Hazard Review

Flying Particles	Power Tool Operation	Noise
Pinching & Cutting	Caustic or Volatile Hydraulic Liquids	Crushing
Noxious or Irritating Fumes	Burns	Lifting
Moving Equipment	Cuts and Abrasions	Slip, Trip and Fall
Pressurized Hoses	Electrical Shock	

1. Be familiar with first aid kits, fire extinguishers in the work area and check regularly for proper operation.
2. Review Safe Operating Procedures for hand tools-chippers and grinders.
3. Route for electrical cords or air lines to prevent tripping hazards.
4. Wear appropriate personal protective equipment including hard hats, long sleeve shirts, gloves and masks.
5. Shield work area or exclude unprotected personnel from high velocity flying debris.
6. Hazardous wastes and cleaning chemicals are to be stored and disposed of only in accordance with approved procedures.
7. Ensure that adequate ventilation is provided when working in confined spaces.
8. Ensure that work area is free of combustible materials, liquids and gases.
9. Review MSDSs for all chemicals used.

Related SOPs

General SOPs	Chapter 10	Chemical/High Pressure Wash Metal Cleaning	11A-23
Metal Removing by Machine.....	11A-26	Confined Space Entry	11E-1
Hand Tools (Power and Manual)	12B-13		

Metal Punching, Forming and Shearing

Hazard Review

Pinching and Crushing Injuries Cuts, Scrapes and Bruises	Eye Injuries	Lifting
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1. OSHA regulations related to punching, forming and shearing equipment are specific and stringent; be certain that applicable rules have been explained and are fully understood.
2. Never operate a machine without proper guarding in place and functioning.
3. Wear appropriate personal protective equipment consistent with the hazard.
4. Eye protection is required by any personnel in proximity of punching, shearing or bending operations as defined by yellow aisle markings.
5. Never operate a power actuated punch, shear or bending machine until you have received instructions on the specific machine to be used and its safety devices.
6. Check punches, dies, rams, hold-downs and strippers (when applicable) for proper adjustment, alignment and proper, secure mounting prior to operation.
7. If two operators are used to feed material, agree on who will actuate the machine and a “ready” signal for each person.
8. Use proper lifting and handling techniques. When required use overhead cranes, forklifts or another person.
9. Be certain where scrap material or “bend-ups” will go and that this area is clear.
10. Do not wear loose fitting clothes or neckties.
11. Before beginning a job, ensure a neat orderly workspace with sufficient clearance for handling raw material, finished goods and scrap.
12. Review MSDSs for all chemicals used.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
Maintenance and Repair Shops (General)	11A-21	Metal Removing by Machine.....	11A-26
High Pressure Hoses.....	11E-5	Rigging.....	11E-8
Forklift.....	12A-6		

Metal Removing by Machine

Drills, Mills, Lathes and Grinders of All Types

Hazard Review

Eye Injuries	Pinch Points	Slip, Trip and Fall
Electric Shock	Solvents	

1. Never operate any metal removal machine until you have been fully instructed on the machine's set-up, controls, safety devices and proper operation.
2. Never operate a machine in this category wearing loose fitting clothes, long sleeve shirts with cuffs either unbuttoned or not rolled up above the elbow, a neck tie, rings or jewelry.
3. Safety glasses are required of any person in proximity of metal removing machinery as defined by the yellow aisle markings.
4. Never adjust a machine until the spindle has completely stopped.
5. Be certain that all guards and shields are in place and functioning.
6. Do not use a machine in any manner other than that intended by the manufacturer; do not overload a machine.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Maintain a neat, orderly work area; place all scrap in proper containers periodically to avoid dangerous build-ups around rotating machines or where they represent a tripping hazard.
9. Do not allow machines to continue running unattended. Do not carry on conversations with your back to a machine in operation.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. When using hand tools to adjust or tighten machine parts or tools, be sure the spindle is completely stopped and that you have sound footing and good balance.
12. Be sure that cutting tools are sharp, properly adjusted and fully tightened before turning on the machine.
13. Review MSDSs for all chemicals used.

Related SOPs

General SOPsChapter 10	Hoisting/Jacking11A-9
Maintenance and Repair Shops (General)11A-21	Mechanic Operations11A-22
Lockout/Tagout.....11E-7	Rigging.....11E-8
Hand Tools (Power and Manual)12B-13	

Oxy - Acetylene Cutting/Welding

Hazard Review

Lifting	Debris In Eyes	Burns To Eyes and Exposed Skin
Fire	Burning Clothes	Explosion
Pinching, Cutting and Crushing	Confined Space	Toxic Fumes

1. Do not attempt to use oxy-acetylene cutting equipment until properly trained.
2. Avoid exposing cylinder to excess heat.
3. Always wear approved safety equipment: gloves, goggles, helmets, etc.
4. Check work area for flammable materials and keep fire extinguishers nearby.
5. Keep oil and grease from hoses, cylinder, regulator and all fittings.
6. Never use oxygen as a substitute for compressed air or feed into a confined space.
7. Keep an adequate space between your work and the cylinders.
8. Acetylene should never be used above 15 PSI.
9. Use a striker to light the torch, not matches or lighters. Do not re-light the torch from hot metal.
10. Use correct pressures and tip sizes.
11. Never wrap hose or hang torch around cylinder valves or regulators.
12. Hoses should have check valves in correct position.
13. Have good ventilation while cutting. Respiratory equipment may be required.
14. Never cut or weld on any container that has held flammable substance without consulting AWS publication A6.0-65.
15. Keep hoses away from sparks, hot metal, sharp surfaces and from being run over by heavy equipment.
16. Always stand to one side of an oxy-acetylene outfit when turning on the cylinders.
17. Never move a cylinder by dragging, sliding or rolling.
18. Keep protective cap in place and avoid striking it against something that could cause a spark.
19. Identify oxygen and acetylene tanks by labelling, not by color code alone.
20. Blow out cylinder valves before attaching regulator.
21. Release regulator screw before opening valve. Open cylinder valve slowly.
22. Do not allow cylinders to lie in a horizontal position.
23. Do not pick up cylinders using the valve protector cap.
24. Acetylene valve should not be opened more than one half turn. Oxygen valve should be fully opened when in use.
25. If the cylinder valves leak or function improperly, do not attempt to repair. Contact the supplier.
26. Cylinders shall be properly secured to prevent them from being knocked over.
27. Cylinders shall not be transported with gauges attached.
28. Release pressure on regulators when work is finished.
29. Light the acetylene gas before opening the oxygen valve.

Related SOPs

General SOPs	Chapter 10	Arc Welding	11A-40
Structural Steel Fabrication	11B-71	Confined Space Entry	11E-1

Photogrammetry Laboratory

Hazard Review

Hazardous Chemicals

Electric Shock

Slip, Trip and Fall

Moving Machinery

1. Be thoroughly familiar with the hazards of the chemicals used. Review applicable MSDSs.
2. Avoid splashing and spilling chemicals. Wipe all spills immediately.
3. Wear protective clothing, such as lab apron eye protection and rubber gloves when handling chemicals.
4. Wear respirator when mixing and transferring chemicals.
5. If chemicals get into the eyes, immediately flush eyes with water for approximately 15 minutes.
6. If chemicals come in contact with the skin, immediately wash with water.
7. Always dispose of chemicals properly. Do not mix with other chemicals.
8. Observe all warnings and cautions as noted on equipment.
9. Do not defeat or bypass built in equipment safety features.
10. Disconnect electrical power before servicing when possible.
11. For equipment with separate electrical switch boxes, use lockout/tagout methods.
12. If electrical power must be applied for servicing or trouble shooting, use caution to prevent injury.
13. Keep hands, fingers and tools clear of moving parts.
14. Do not wear loose-fitting clothing or jewelry while performing maintenance on equipment.
15. Store all cables and tubing properly to eliminate tripping hazards.

Related SOPs

General SOPsChapter 10

Hazardous Waste Handling and Storage11E-4

Shop/Vessel Pipefitting

Hazard Review

Noise	Hazardous Materials	Explosive Atmospheres
Confined Spaces	Poor Visibility	Lifting
Temperature Extremes	Pressurized Systems	Oxygen Deficient Atmospheres

1. Wear appropriate personal protective equipment consistent with the hazard. Proper equipment shall be used to protect against contaminants, eye injury and hearing loss.
2. Confined spaces must be well ventilated prior to entry and checked by a certified competent person. Never enter a confined space without a standby observer.
3. Be aware of the safety precautions regarding handling of hazardous materials. Ensure MSD units are pumped out, flushed and well ventilated prior to work. A “Certified Competent Person” must test the affected space for hydrogen sulfide and explosive vapors.
4. Electrical equipment, including lighting, pumps, switches, power tools and automatic starting machinery, should be checked for defects. Use Lockout/Tagout procedures as appropriate.
5. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
6. Know the causes and symptoms of heat stress and respond accordingly.
7. Check pressurized piping, hoses, tanks, steering systems, etc., for unsafe conditions prior to work. De-energize, de-pressurize and/or exercise systems prior to repair. If in doubt, consult supervisor.
8. Ensure chain hoist, lifting devices and other rigging equipment are in good operating condition prior to use. Return defective equipment for repair.
9. Read and comply with Facility Safety Manual and other pertinent instructions.
10. Read product labels, MSDSs and manufacturers labels before handling chemicals. Hazardous materials should be properly stored and must be in accordance with manufacturers guidelines.
11. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate them.
12. Proper lifting techniques shall be used. Get help or use equipment if necessary.
13. Use appropriate supplemental lighting when working in dark, poorly lighted and/or limited work spaces.
14. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.

Related SOPs

General SOPsChapter 10	Oxy-Acetylene Cutting/Welding11A-27
Arc Welding.....11A-40	Confined Space Entry11E-1
High Pressure Hoses.....11E-5	Lockout/Tagout.....11E-7
Rigging.....11E-8	Hand Tools (Power and Manual)12B-13

Plumbing Operations

Hazard Review

Trench Collapse	Burns	Lifting
Slip, Trip and Fall	Noise	Hazardous or Noxious Fumes
Moving Equipment	Crushing Injuries	

1. Ensure use of proper equipment and procedures in excavating and shoring of ditches.
2. Use proper techniques in lifting pipes; use equipment or more help if needed.
3. Wear personal protective equipment consistent with the hazard.
4. Use correct tools and equipment designed for the job.
5. Use extreme caution and ensure clear work area.
6. Ensure required protective equipment is in working order and accessible at the job site.
7. Evaluate site and follow Excavation, Trenching and Shoring Standards.
8. Use extreme caution in the removal of steam lines. Discharge all pressure and drain lines before opening.
9. Safety glasses must be worn during any soldering, cutting or threading operation.
10. Establish eye contact with operator before approaching equipment.
11. Determine traffic control needs from Work Zone Safety Handbook.

Related SOPs

General SOPsChapter 10	Confined Space Entry11E-1
Excavating, Trenching and Shoring11E-2	High Pressure Hoses11E-5
Rigging.....11E-8	Hand Tools (Power and Manual)12B-13

Print Shop Activities

Hazard Review

Slip, Trip and Fall	Pinch Points	Moving Machinery
Cuts and Scrapes	Burns	

1. Switch machines off when clearing paper jams or straightening paper in machines. When servicing, cleaning or setting up machine, use lockout/tagout procedures.
2. Make sure all safety covers and guards are in place.
3. Do not turn hand wheels with finger on perforating blades.
4. Do not leave operating machine unattended.
5. Keep loose-fitting clothes away from rollers and gears.
6. Keep hands and fingers clear of heating wire and machinery.
7. Only one person at a time should operate paper cutter.
8. Use two hands to operate paper cutter.
9. Dispose of oily or cleaning rags in an OSHA-approved metal container secured by a metal lid.
10. Store flammable materials in an OSHA-approved fire safety cabinets.
11. Store corrosive materials separate and apart from flammable materials.
12. Do not stack cases more than four (36") high.
13. Review applicable MSDS for chemicals used.

Related SOPs

General SOPsChapter 10

Sandblasting

Hazard Review

Flying Particles	Dust	Lifting
Hazardous Material	Moving Traffic	

Sand Reservoir and Hose Assembly

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Check all fittings for leaks and alignments.
3. Muffler should be attached to compressor to reduce blowback noise.
4. Check position of all valves before activating blaster. Nozzle should have a “Dead Man” shutoff valve.
5. Drain water from the separator.
6. Stand clear and do not face sand reservoir after filling. Be careful not to overfill.
7. Keep unauthorized personnel out of immediate sandblast area.
8. Check blasting hoses for rips, tears and soft spots. Do not use defective hoses.
9. Check nozzle shutoff mechanism prior to use and check nozzle for wear.
10. Do not allow vehicles to run over hoses. Avoid kinks and sharp turns in hoses.
11. Avoid dragging hoses over concrete or any surface that could induce wear.

Sandblasting Hood

12. Adjust helmet headband and chin strap to proper size. Clean and disinfect hood before use.
13. Make sure hood-skirting is fitted down over shoulder and snaps are fastened.
14. The waist belt for the air hose should be worn outside of skirting to allow easy adjustment.
15. Check the air supply system.
16. Long sleeve shirts, safety glasses, safety shoes and hearing protection are required.
17. A positive pressure air hood is required. The supplied air must be at least *Grade D* breathable air.

Grade D air has the following characteristics:

 - Oxygen content from 19.5 to 23.5 percent
 - Condensed oil at 5 mg/m³
 - Carbon monoxide (CO) not to exceed 10 parts per million (ppm)
 - Carbon dioxide (CO₂) not to exceed 1000 ppm
 - No odor

Hazardous Material Note

When red lead is encountered or is suspected in removal operation, stop immediately and consult supervisor.

Related SOPs

General SOPs	Chapter 10	Abrasive and Waterblast Cleaning	11A-1
Hazardous Waste Handling and Storage	11E-4	Rigging.....	11E-8
Air Compressor.....	12B-1		

Service Station Operation

Hazard Review

Explosions	Smoking	Moving Vehicles and Equipment
Spills or Fuel Leaks	Remove Hose From Vehicles	

1. Drive up to the dispensers with filler cap adjacent to dispenser and leave enough room to get fuel safely. Do not drive over hose.
2. Turn off engine.
3. Extinguish all smoking material before dispensing fuel.
4. Stay with dispenser until tank is filled.
5. Return dispensing hose to its proper rest.
6. Watch for other traffic; do not back away from island.
7. Check for clearance and traffic in all directions before moving away from island.
8. Fire extinguishers should be prominently displayed and routinely checked for sufficient charge.
9. Warning decals and symbols should be displayed on each dispenser.
10. Use specifically designed oil absorption materials to clean up spills. Do not rinse and wash away.

Related SOPs

General SOPs	Chapter 10	Hazardous Waste Handling and Storage	11E-4
Lockout/Tagout.....	11E-7	Fuel and Lube Truck	12A-32

Sewing and Upholstery

Hazard Review

Sharp-Pointed Tools	Chemical Solvents	Cuts and Pinch Points
Eye Injuries	Puncture Wounds	Slip, Trip and Fall

1. Wear appropriate personal protective equipment consistent with the hazard.
2. Safety glasses are required for all operations.
3. Never re-thread a sewing machine or replace a bobbin with power switch on.
4. Assure all covers and guards are in place and functioning.
5. Review MSDSs before using glues, solvents or epoxies.
6. Be aware of excess material and yard goods which can create a tripping hazard; maintain a neat orderly work place, free of cuttings and trimmings.

Related SOPs

General SOPs	Chapter 10	Maintenance and Repair Shops (General)	11A-21
Hand Tools (Power and Manual)	12B-13		

Shipyard Painting

Hazard Review

Noise	Confined Spaces	Pressurized Hoses
Skin Irritation	Toxic Chemicals	Airless Sprayers
Oxygen Deficient Atmospheres	Temperature Extremes	Poor Visibility
Hazardous Materials		

1. Wear appropriate personal protective equipment consistent with the hazard. Each employee shall be fit tested and instructed on the use and care of respirators. Proper protective equipment shall be worn to protect against contaminants.
2. Read product labels, MSDSs and manufacturers labels before handling chemicals. Hazardous materials should be properly stored and must be in accordance with manufacturers guidelines.
3. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate them.
4. Confined spaces must be well ventilated prior to entry and checked by a certified competent person. Never enter a confined space without a standby observer.
5. Painting involves the use of high pressure hoses which shall be inspected for defects before each use and replaced as necessary.
6. Always keep the tips of airless sprayers away from yourself or others since they can cause the injection of chemicals into the skin or eyes.
7. Accessory equipment (Man lifts, Scissors lifts, etc.) shall be operated in a safe manner as established in applicable training programs and manufacturer’s guidelines.
8. Use flashlights or appropriate supplemental lighting when working in dark, poorly lighted and/or limited work spaces.

Related SOPs

General SOPs	Chapter 10	Lifting/Fleeting Vessels	11A-11
Maintenance and Repair Shops (General)	11A-21	Chemical/High Pressure Wash Metal Cleaning	11A-23
Mechanical/Abrasive Metal Cleaning	11A-24	Sandblasting.....	11A-32
Confined Space Entry.....	11E-1	High Pressure Hoses	11E-5
Rigging.....	11E-8	Air Compressor.....	12B-1
Hand Tools (Power and Manual)	12B-13		

Tire Repair

Hazard Review

Lifting	Crushing Injuries	Slip, Trip and Fall
Explosions	Noise	Pinching Injuries

1. The employee must not service any rim or wheel unless the employee has been instructed in correct procedures of mounting, demounting and servicing activities for tires and rims and the safe operating precautions for the type of wheel being serviced.
2. The employee must wear eye and foot protection.
3. The tire must be completely deflated by removing the valve core before a rim wheel is removed from the axle.
4. An approved rubber lubricant must be applied to the bead and rim mounting surfaces when assembling the wheel and inflating the tire. Never use any flammable material, soap or grease to seat tires.
5. If a tire on a vehicle is underinflated but has more than 80 percent of the recommended pressure, the tire may be inflated while the rim wheel is on the vehicle, provided remote control inflation equipment is used, and no employee remains in the trajectory area during inflation. When 80% or less of the pressure remains, the repair must be handled by a trained tire mechanic.
6. The tire shall be inflated outside a restraining device only to a pressure sufficient to force the tire bead onto the rim ledge and create an air tight seal. (Not to exceed 10 psi.)
7. Whenever a rim wheel is in a restraining device, the employee must not rest or lean against the restraining device. Always stand to the side.
8. After inflation, the tire and wheel must be inspected while still within the restraining device to make sure that they are properly seated and locked. If further adjustment is necessary, the tire must be deflated by removing the valve core before the adjustment is made.
9. Do not attempt to correct the seating of side and lock rings by hammering, striking, or forcing the components while the tire is pressurized.
10. Cracked, broken, bent or otherwise damaged wheel components must not be reworked, welded, brazed, or otherwise heated. Heat must not be applied to any wheel.
11. After repairs or installation of tire or rim, place tire in safety cage and inflate to maximum inflation pressure. Then deflate to 20 PSI before removing from cage.
12. Stored mounted tires should not exceed 20 PSI.
13. Fully inflated, multi-piece wheels must not be transported except in a restraining device.
14. For additional information consult the following: Hand and Power Tools, OSHA 3080; OSHA Reg. 1910.17; National Rim & Wheel W-770; OSHA Pamphlet 3086; OSHA Rim Wheel Characteristics.

Related SOPs

General SOPs	Chapter 10	Maintenance and Repair Shops (General).....	11A-21
High Pressure Hoses.....	11E-5	Air Compressor.....	12B-1

Traffic Services' Shops and Warehouses

Hazard Review

Slip, Trip and Fall	Lifting	Hot Surfaces
Sharp Tools	Sharp Edges, Burrs	Electrical Shock

1. Wear appropriate personal protective equipment consistent with the hazard. Gloves should be used when handling hot materials and materials or tools with sharp edges or burrs. Eye protection is important when task creates flying chips, burrs, etc.
2. Proper lifting techniques shall be used. Get help or use equipment if necessary.
3. Be aware of loose material, tripping hazards and other obstructions. Good housekeeping is important to eliminate slips, trips and falls.
4. Do not touch any wiring with which you are unfamiliar because of danger of electrical shock.
5. Spilled glass beads should be removed promptly to eliminate slippery surface.
6. All sign shop painting and screening shall be conducted in a well-ventilated area, using exhaust fans and filters.

Related SOPs

General SOPsChapter 10	Electrical Installation/Repairs11A-4
Forming and Shearing Metal Punching11A-25	Warehouse.....11A-39

Trichloroethane Still

Hazard Review

Hazardous Chemicals

Noxious Vapors

1. No employee may operate the still until he has received thorough training on the procedures for operating a still.
2. Each still operator shall review the Material Safety Data Sheets (MSDS) before starting work.
3. Employees should inspect the still and related equipment to ensure it is in good condition before each work shift.
4. Each still operator must obtain and wear the proper personal protective equipment such as face shield, safety goggles, gloves, rubber aprons, etc.
5. Each still operator must ensure that adequate ventilation (mechanical or natural) is properly operating before beginning work.
6. Each still operator shall follow proper lifting procedures or use mechanical devices whenever trico cans must be moved or poured.
7. Still operators shall never leave a still unattended while distillation is in progress.
8. Each still operator should thoroughly review the work area before beginning operation to ensure that safety response items (eye wash bottle or shower), spill control materials, and other items for emergency response are readily available and accessible.
9. Still operators must report all spills to their supervisor as soon as possible after containing the leakage.

Related SOPs

General SOPsChapter 10 Hazardous Waste Handling and Storage 11E-4

Warehouse

Hazard Review

Hazardous Materials	Slip, Trip and Fall	Fire
Improperly Stacked Material	Moving Equipment	

1. Wear personal protective equipment consistent with the hazard. Steel-toe shoes are required.
2. Be aware of the wide variety of chemicals, cleaning agents, degreasers, paints, thinners and other combustible materials stored in the warehouse. Read and follow warning labels on containers and on MSDSs, ensuring materials are handled and stored properly.
3. Be familiar with the Facility Contingency Plan. Notify the supervisor if a hazardous substance is spilled. Follow proper procedure for clean up.
4. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
5. Material handling equipment (forklifts, pallet truck, etc.) shall be operated in a safe manner, as established in applicable training programs and manufacturer's guidelines. Pedestrians should be alert for moving forklifts when approaching blind corners.
6. Material shall be stacked properly for safe and efficient retrieval. Keep heavier materials near floor. Stack items so that they do not extend into aisles. Be sure bin items do not extend into walkways and that bin drawers are not left open.
7. Be alert for materials which may have been stored improperly.
8. Proper lifting techniques shall be used. Get help or use lifting equipment if necessary.
9. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate them.
10. If ladder is used, follow standard operating procedures and manufacturer's recommendations.
11. Label all fire exits.

Related SOPs

General SOPs	Chapter 10	Loading/Unloading Freight.....	11A-12
Forklift.....	12A-6	Ladder.....	12B-15

Arc Welding

Hazard Review

Ultraviolet Burns To Eyes and Skin	Fire	Debris To Eyes and Exposed Skin
Slip, Trip and Fall	Hot Metal Spatter	Overhead Loads
Cuts and Pinches	Lifting	Electrical Shock

1. Do not attempt to use welding equipment until properly trained.
2. Welding machine shall be equipped with a power disconnect switch which is conveniently located at or near the machine.
3. Protect yourself and others from flying objects. Make sure your own eyes and eyes of others are protected when chipping slag, etc.
4. Be sure the welding area has a good safe floor. Concrete or masonry is recommended. The floor should not be wood, plastic tile or carpeted.
5. Keep combustible or flammable materials at a safe distance (at least 35 feet).
6. Do not use gloves or other clothing which contain oil and grease. Do wear appropriate gloves.
7. Always be sure your machine is properly grounded.
8. The polarity switch must never be changed while machine is under load. Wait until the machine is idling and the circuit is open.
9. Protect others with a screen and yourself with a protective welding helmet. Flying sparks are a danger to your eyes. Arc rays can also cause painful burns to yourself and onlookers.
10. Keep a fire extinguisher handy at all times.
11. Avoid damp areas and keep the hands and clothing dry at all times. Dampness on the body may cause an electrical shock.
12. Never strike an arc on a compressed cylinder or tank, even if empty, that has contained combustible material.
13. Suitable spark shield must be used around welding equipment in flash welding.
14. Keep the uninsulated portion of the electrode holder from touching the welding ground when the current is on. This will cause a flash.
15. Keep welding cables dry and free from oil and grease and uncoil cable to remove loops and tangles.
16. Weld in open area. If welding is to be done in a confined area, provide an adequate exhaust fan system and ventilation.
17. Dress properly with flame resistant clothing. Protect all areas of body from arc burns.
18. Be sure all power wiring is correctly installed and maintained. Don't overload the welding cables.
19. Do not operate power tools off generator/welder while it is being used for welding.
20. For additional information consult the following: AWS Specifications & Safe Practice Codes.

Related SOPs

General SOPs	Chapter 10	Oxy-Acetylene Cutting/Welding	11A-27
Structural Steel Fabrication	11B-71	Confined Space Entry	11E-1

Wood Working

Hazard Review

Cuts	Allergic Reaction	Splinters
Fire	Flying Wood Chips or Parts	Pinching/Crushing Injuries
Eye Injury	Dust Inhalation	

1. Know and regularly review Safe Operating Procedures of each piece of equipment.
2. Make sure work areas are clear and safe for work to be done.
3. Wear safety shoes, eye and ear protection.
4. Make sure depth and thickness levels are properly set.
5. See that blades and knives are sharp and working properly.
6. Make sure all work surfaces are clear of scraps and obstructions.
7. Never operate equipment until guards are in place and operating properly.
8. Be aware of others around so that nothing is thrown from a saw which may cause injury.
9. Make sure on and off switches are in proper working condition.
10. Keep hands and clothing away from cutting surface.
11. Never adjust settings on machinery until switch is off and blades have ceased to rotate.
12. Safety glasses are required inside the yellow lines of the shop.
13. Use safe lifting practices.
14. Do not wear rings, ties or loose fitting clothing when operating machinery.
15. Use respirators when needed.
16. Do not use any equipment or perform any operation until fully trained and certified by the supervisor.

Related SOPs

General SOPsChapter 10 Hand Tools (Power and Manual)12B-13

Aerial Photography

Hazard Review

Lifting

Ground Activities

1. Do not lift the aerial camera system without the aid of a mechanical lift.
2. Use extreme caution when installing/removing the camera system in the aircraft.
3. For operations requiring the use of interchangeable lens cones always obtain additional employees for removal of the drive unit and appropriate lens cone.
4. Use proper lifting techniques and support devices when moving camera systems.

In-flight Activities

1. Secure all equipment (film cassettes, tool kits, etc.) before flight to prevent injury during turbulent conditions.
2. When shooting aerial photography in high-density traffic areas, one intercom system should be used between the pilot and the photographer; a separate intercom should be used for communication between the co-pilot and the air traffic controller.
3. Changing aerial camera lens cones must take place while the aircraft is on the ground. Under no circumstances should the lens cones be changed while in flight.
4. Air crew members suffering from head colds or other upper respiratory ailments should not fly in nonpressurized aircraft operating at multiple altitudes until the symptoms have dissipated.

Related SOPs

General SOPsChapter 10

Asphalt Field Laboratory

Hazard Review

Lifting	Overhead Loads	Hazardous Chemicals
Slip, Trip and Fall	Moving Equipment	

1. Park in areas that: provide safe entrances and exits for the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
2. Wear appropriate personal protective equipment consistent with the hazard. Gloves and eye protection are recommended. Plant sites are generally designated "Hard Hat Areas," requiring hard hats outside of buildings and equipment. Hard hats should always be worn when obtaining samples and inspecting plant.
3. Avoid walking and working under suspended loads.
4. Be aware of moving equipment on plant site. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
5. Proper lifting techniques shall be used.
6. Be aware of escape routes in case of emergency.
7. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
8. Review MSDS for 1,1,1 Trichloroethane, AC and aggregates.
9. Be sure that an eye wash bottle is readily available and accessible before beginning work.
10. Be sure ventilation equipment is operating during trichloroethane use. Be sure trichloroethane containers are properly sealed when not in use and stored.

Related SOPs

General SOPsChapter 10	Trichloroethane Still.....11A-38
Roadway Inspection11B-63	Sampling and Inspection at Producer's Facility.....11B-65
Hazardous Waste Handling and Storage11E-4	

Asphalt Overlays/Widening

Hazard Review

Moving Traffic	Hot/Flammable Materials	Overcrowding of Workers
Flying Particles	Slip, Trip and Fall	Moving Equipment
Temperature Extremes	Utility Lines	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Safety vests are required.
5. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
7. Keep fire extinguishers available at all times when using a fired kettle.
8. Use caution when handling hot/flammable materials. Review MSDSs for each material used.
9. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
11. Allow ample space for each employee to work safely.
12. Before backing, make sure area is clear and use an observer when available.
13. Observe and stay clear of overhead utility lines.
14. Watch for flying sand and rock from sweeping operation and adjacent traffic.

Related SOPs

General SOPsChapter 10	Asphalt Distributor12A-1
Grader.....12A-7	Pavement Grinder12A-13
Paving Machine/Widener12A-14	Patch Rollers12A-16
Crew Cab and Flatbed Truck12A-29	Dump Truck.....12A-30
Hand Tools (Power and Manual)12B-13	Trailers and Towed Equipment.....12B-29

Asphalt Pavement Maintenance

Hazard Review

Moving Traffic	Moving Equipment	Hot/Flammable Materials
Slip, Trip and Fall	Overcrowding of Workers	Temperature Extremes
Utility Lines	Flying Particles	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
7. Keep fire extinguishers available at all times when using a fired kettle. Extinguisher should be on other equipment, not kettle.
8. Use caution when handling hot/flammable materials. Review MSDSs for each material used.
9. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
11. Allow ample space for each employee to work safely.
12. Use proper lifting and handling techniques while shoveling asphalt.
13. Before backing, make sure area is clear and use an observer when available.
14. Observe and stay clear of utility lines.
15. Use extra precautions when mounting and dismounting trucks to cover and uncover loads and to dispense material.
16. Be aware of flying debris from power broom, moving traffic, jack hammers, saws, picks, etc.

Related SOPs

General SOPsChapter 10	Asphalt Overlays/Widening.....11B-3
Bituminous Surface Treatment.....11B-5	Inmate Labor11B-42
Asphalt Distributor12A-1	Broom12A-3
Forklift.....12A-6	Asphalt Patcher Truck.....12A-27
Crew Cab and Flatbed Truck12A-29	Dump Truck.....12A-30
Air Compressor.....12B-1	Hand-Operated Compactor.....12B-5
Curb Machine12B-10	Hand Tools (Power and Manual)12B-13
Impactor–Asphalt Cutter.....12B-14	Trailers and Towed Equipment.....12B-29

Asphalt Plant Operations

Hazard Review

Moving Equipment	Hot/Flammable Materials	Slip, Trip and Fall
Temperature Extremes	Flying Particles	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks before arriving at the asphalt plant site.
2. The asphalt plant site is a hard hat area. Hard hats shall be worn at all times while on the asphalt plant site.
3. Upon arriving at the asphalt plant site, spray dump truck bed with water or other protectant liquid.
4. Upon arriving at the asphalt plant, communicate with the asphalt plant operator on:
 - The amount of asphalt (the size of the load) that is to be received
 - The number of asphalt drops from the asphalt plant mixer box for your load
 - The amount of time (in seconds) between asphalt drops
 - What methods are being used to communicate that the last drop is completed (e.g. traffic signals, horns, instructional signs, flashing lights, hand signals, eye contact etc.)
5. Prior to pulling the dump truck under the asphalt plant mixer box, wait for a signal from the asphalt plant operator.
6. Pull receiving dump truck under the asphalt plant mixer box and position the dump truck bed directly under the asphalt plant mixer box. If more than one asphalt drop is to be dumped into the receiving dump truck bed, the dump truck operator may reposition the dump truck bed after each dump to evenly distribute the asphalt product in the truck bed.
7. If the dump truck cannot pull underneath the asphalt plant mixer box due to its height, the dump truck may be backed underneath the asphalt plant mixer box.
8. Before backing, make sure area is clear and use an observer when available.
9. While asphalt is being dumped from the asphalt plant mixer box into the dump truck bed, the dump truck operator shall remain inside the dump truck cab. Only between asphalt drops may the dump truck operator inspect the asphalt product in the truck bed.
10. Once the last asphalt drop is made into the dump truck bed, proceed slowly from underneath the asphalt plant mixer box .
11. Once the dump truck is completely from underneath the asphalt plant mixer box, check the asphalt load and cover as applicable to minimize asphalt particles and debris flying off the dump truck bed during travel to the project site.
12. Use extra precautions when mounting and dismounting trucks to cover and uncover loads and to dispense material.
13. Use caution when handling hot/flammable materials. Review MSDS as applicable.
14. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
15. Use proper lifting and handling techniques while shoveling asphalt.

Related SOPs

General SOPs	Chapter 10	Asphalt Overlays/Widening	11B-3
Bituminous Surface Treatment.....	11B-5	Asphalt Distributor	12A-1
Asphalt Patcher Truck	12A-27	Crew Cab and Flatbed Truck	12A-29
Dump Truck	12A-30	Impactor–Asphalt Cutter	12B-14

Bituminous Surface Treatment

Hazard Review

Moving Traffic	Hot/Flammable Materials	Overcrowding of Workers
Flying Particles	Slip, Trip and Fall	Moving Equipment
Temperature Extremes	Utility Lines	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
7. Keep fire extinguishers available at all times when using a fired kettle.
8. Use caution when handling hot/flammable materials. Review MSDSs for each material used.
9. Take extra precautions to prevent heat stress when working in extremely hot temperatures.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
11. Allow ample space for each employee to work safely.
12. Before backing, make sure area is clear and use an observer when available.
13. Observe and stay clear of overhead utility lines.
14. Watch for flying sand and rock from sweeping operation and adjacent traffic.
15. Use proper lifting and handling techniques while shoveling stone.

Related SOPs

General SOPs	Chapter 10	Borrow Pit, Waste Pit and Stockpiling Operations	11B-7
Asphalt Distributor	12A-1	Broom	12A-3
Front End Loader.....	12A-11	Patch Rollers	12A-16
Aggregate Spreader	12A-21	Dump Truck.....	12A-30
Hand Tools (Power and Manual)	12B-13	Trailers and Towed Equipment.....	12B-29

Blast Monitoring

Hazard Review

Flyrock	Noise	Moving Equipment
Premature Initiation		

1. Wear appropriate personal protective equipment consistent with the hazard. Hard hats and ear plugs are essential during blasting operations.
2. Be aware that premature initiation of explosives is a possibility and exercise extreme caution in the vicinity of explosives.
3. Be aware of emergency escape routes. It is a good idea to stand close to a sheltered location which will provide protection from flyrock.
4. Employees on foot must use caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
5. Take care not to operate radio transmission equipment in the vicinity of blast sites which are utilizing electric blasting caps.
6. Monitoring equipment should be placed a safe distance from the blasting area to ensure the safety of the individual and to avoid damage to equipment.
7. Review signal system between monitor and blaster prior to operation.

Related SOPs

General SOPs	Chapter 10	Explosives.....	11E-3
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Borrow Pit, Waste Pit and Stockpiling Operations

Hazard Review

Stockpile/trench collapse	Moving equipment	Blowing sand/fines
Noise	Uneven terrain	Utility lines

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Review Mine Safety Act requirements.
3. Evaluate site and follow excavation, trenching and shoring standards that apply.
4. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
5. Wear appropriate personal protective equipment consistent with hazards.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Avoid areas behind operating equipment.
7. Observe and stay clear of overhead utility lines.
8. Be aware of loose material, excavation drop-offs, uneven ground and other obstructions.
9. Before backing, make sure area is clear and use an observer when available.
10. Be aware of stockpile stability when removing material. Do not leave vertical slopes in stockpiles that could collapse on a person on foot.
11. Drivers should stay in cab while truck is being loaded.

Related SOPs

General SOPs	Chapter 10	Bituminous Surface Treatment	11B-5
Earth Moving.....	11B-23	Crane/Dragline	12A-4
Excavator, Hydraulic.....	12A-5	Front End Loader	12A-11
Backhoe and Loader	12A-22	Crawler Tractor.....	12A-23
Crew Cab and Flatbed Truck	12A-29	Dump Truck.....	12A-30

Bridge Deck Cleaning

Hazard Review

Moving Traffic	Lifting	Flying Particles
High Pressure Hoses	Utilities	Noise
Slip, Trip and Fall		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of loose materials, tripping hazards and other obstructions.
8. Allow ample space for each employee to work safely.
9. Locate all utilities in and near work site prior to commencing work.
10. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards can not be avoided.
11. Be alert to protruding nails or spikes in decks and rails.
12. Keep walk spaces and work areas free of loose materials or tools.
13. Observe Safe Operating Procedures for handling high pressure hoses.
14. Unnecessary personnel shall stay away from work area.
15. Safety goggles should be worn by personnel that are in the immediate work area due to flying particles caused by high pressure air or water.
16. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
17. Employees should wash hands before eating, drinking or smoking.
18. Review MSDSs for all hazardous materials being used or expected to encounter.
19. High pressure air hoses should have a “dead-man” shutoff valve.

Related SOPs

General SOPsChapter 10	High Pressure Hoses11E-5
Crew Cab and Flatbed Truck12A-29	Air Compressor.....12B-1
Hand Tools (Power and Manual)12B-13	Water Pump.....12B-32

Bridge Expansion Joint Maintenance

Hazard Review

Moving Traffic	Lifting	Hazardous Materials
Utilities	Parking	Noise
Slip, Trip and Fall		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Be aware of loose materials, tripping hazards and other obstructions.
7. Allow ample space for each employee to work safely.
8. Locate all utilities in and near work site prior to commencing work.
9. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
10. Be alert to protruding nails or spikes in decks and rails.
11. Keep walk spaces and work areas free of loose materials or tools.
12. Review MSDSs for all hazardous materials being used or expected to encounter.
13. Do not clean hands with pressurized air.
14. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
15. Employees should wash hands before eating, drinking or smoking.
16. Dispose of salvage materials properly.
17. Watch for flying sand, dust or other debris when blowing out joints with compressed air. Eye protection must be worn. Be aware of wind direction and try to work upwind.

Related SOPs

General SOPs	Chapter 10	Crack Sealing	11B-15
Crew Cab and Flatbed Truck	12A-29	Air Compressor.....	12B-1
Hand Tools (Power and Manual)	12B-13		

Bridge Handrail Maintenance

Hazard Review

Moving Traffic	Welding/Cutting	Parking
Utilities	Lifting	Slip, Trip and Fall

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Try to perform work while facing traffic.
8. Be aware of loose materials, tripping hazards and other obstructions.
9. Allow ample space for each employee to work safely.
10. Locate all utilities in and near work site prior to commencing work.
11. Be alert to poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
12. Be alert to protruding nails or spikes in decks and rails.
13. Review MSDSs for all hazardous materials being used or expected to encounter.
14. Dispose of salvage materials properly, use gloves and long-sleeved shirts when handling treated timbers.
15. Be aware of pinch points and crushing hazards.
16. Take extra precaution to prevent heat and cold stress when working in extremely hot or cold temperatures.
17. Employees should wash hands before eating, drinking or smoking.
18. Observe Safe Operating Procedures for welding and cutting.
19. Observe Safe Operating Procedures for scaffolding if applicable.

Related SOPs

General SOPs	Chapter 10	Oxy-Acetylene Cutting/Welding	11A-27
Arc Welding.....	11A-40	Guardrail Installation/Maintenance	11B-39
Placing Concrete	11B-56	Snooper Crane	12A-20
Crew Cab and Flatbed Truck	12A-29	Hand Tools (Power and Manual)	12B-13
Scaffolding.....	12B-22		

Bridge Jacking

Hazard Review

Overload	Kickout	Crushing
Shifting Loads	Lifting	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Know rated capacity of jacks to avoid overload.
3. Know approximate weight of load. Operate within safe limits.
4. Use stable base to position jacks.
5. Keep unnecessary personnel clear of loaded area when lifting or lowering.
6. When multiple jacks are used, lifting and lowering should be uniform.
7. The load shall be braced with blocks or with some other approved means before work commences.
8. Keep all objects clear that could cause lateral forces to be applied to the jack.
9. Be aware that jacks could “kick out” due to shifting loads. If jack starts to tilt while jacking, stop immediately, relieve load and reposition jack.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
High Pressure Hoses.....	11E-5	Rigging.....	11E-8
Snooper Crane	12A-20	Crew Cab and Flatbed Truck	12A-29
Hand Tools (Power and Manual)	12B-13	Ladder.....	12B-15
Scaffolding.....	12B-22		

Concrete Bridge Deck Maintenance

Hazard Review

Moving Traffic	Lifting	Hazardous Material
Parking	Utilities	Noise
Slip, Trip and Fall		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Be aware of loose materials, tripping hazards and other obstructions.
7. Allow ample space for each employee to work safely.
8. Locate all utilities in and near work site prior to commencing work.
9. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
10. Be alert to protruding nails, spikes or reinforcing bars in decks and rails.
11. Keep walk spaces and work areas free of loose materials or tools.
12. Review MSDSs for all hazardous materials being used or expected to encounter.
13. Do not clean hands with pressurized air.
14. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
15. Employees should wash hands before eating, drinking or smoking.
16. Dispose of salvage materials properly.
17. Be aware of escape routes in case of emergency.

Related SOPs

General SOPsChapter 10	Sandblasting.....11A-32
Placing Concrete11B-56	High Pressure Hoses11E-5
Crew Cab and Flatbed Truck12A-29	Air Compressor.....12B-1
Hand Tools (Power and Manual)12B-13	Pavement Breaker.....12B-18

Concrete Bridge Super/Sub Structure Maintenance

Hazard Review

Moving Traffic	Hazardous Materials	Parking
Utilities	Lifting	Jacking
Slip, Trip and Fall	Scaffolding	Noise

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of escape routes in case of emergency.
8. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions.
9. Allow ample space for each employee to work safely.
10. Be alert to poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
11. Be alert to protruding nails, spikes or reinforcing bars in decks and rails.
12. Keep walk spaces and work areas free of loose materials or tools.
13. Review MSDSs for all hazardous materials being used or expected to encounter.
14. Use gloves and wear long-sleeved shirt when handling hazardous materials.
15. Be aware of pinch points and crushing hazards.
16. Take extra precaution to prevent heat and cold stress when working in extremely hot or cold temperatures.
17. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPs	Chapter 10	Sandblasting.....	11A-32
Bridge Jacking	11B-11	Pile Driving.....	11B-53
Excavating, Trenching and Shoring	11E-2	High Pressure Hoses	11E-5
Rigging.....	11E-8	Hand Tools (Power and Manual)	12B-13
Scaffolding.....	12B-22		

Concrete Pavement Maintenance

Hazard Review

Moving traffic	Moving Equipment	Slip, Trip and Fall
Noise	Flying Particles	Pinch Points
Overcrowding of Workers	Lifting	Power Tool Operation
Suspended Loads	Temperature Extremes	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
6. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
7. Review MSDSs for each material used.
8. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
9. Be aware of loose material, excavation drop-offs, tripping hazards, uneven ground and other obstructions.
10. Allow ample space for each employee to work safely.
11. Use proper lifting and handling techniques while breaking and loading old concrete.
12. Wear rubber boots and rubber gloves when working with fresh concrete.
13. Watch for flying sand and rock from sweeping operation and adjacent traffic.
14. Before backing, make sure area is clear and use an observer when available.
15. Be aware of flying debris, wind, moving traffic, jack hammers, saws, picks, etc.

Related SOPs

General SOPs	Chapter 10	Placing Concrete	11B-56
Excavator, Hydraulic.....	12A-5	Backhoe and Loader	12A-22
Air Compressor.....	12B-1	Truck-Mounted Attenuator	12B-2
Concrete Mixer	12B-6	Concrete Pump.....	12B-7
Concrete Saw	12B-8	Hand Tools (Power and Manual).....	12B-13
Pavement Breaker.....	12B-18	Trailers and Towed Equipment.....	12B-29

Construction Elevations on Bridge Beams

Hazard Review

Slip, Trip and Fall	Parking	Communication Difficulties
Temperature Extremes	Overhead Loads	Heights

1. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicle.
2. Avoid walking or working under suspended loads.
3. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes and vests are required safety equipment. Safety belts with lanyards and personal floatation devices may be required.
4. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
5. Do not work on beams without being properly secured when the height of possible fall is 10 feet or greater.
6. Keep walk spaces and work areas free of loose materials and tools.
7. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.

Related SOPs

General SOPs	Chapter 10	Crane/Dragline	12A-4
Rigging.....	11E-8	Scaffolding.....	12B-22
Inspection of New Structures	11B-44		

Post-Tensioning Strand-Cutting and Removal

Hazard Review

Moving Traffic	Welding/Cutting	Parking
Utilities	Lifting	Jacking
Slip, Trip and Fall	Scaffolding	Noise

1. Review Safe Operating Procedures for applicable equipment and perform operational checks.
2. Determine traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Clear the work area of personnel who are not performing the post-tensioning strand-cutting operation. Have these personnel stand out of any trajectory path of either end of the strand being cut. Ensure no bystanders are in the trajectory path of either end of the strand being cut.
8. Proper lifting techniques shall be used. Get help or use equipment if necessary.
9. Be aware of escape routes in case of emergency.
10. Be aware of loose materials, tripping hazards and other obstructions.
11. Allow ample space for each employee to work safely.
12. Locate all utilities in and near work site prior to commencing work.
13. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards cannot be avoided.
14. Keep walk spaces and work areas free from loose materials or tools.
15. Review MSDS for all hazardous materials being used or expected to encounter.
16. Carefully chip away the concrete grout around the end of the strand. Do not stand in front of the strand while chipping away the grout. Use the appropriate tools (hand chisels, hand drills, etc.) to chip away the concrete grout from around the strand end.
17. Observe safe operating procedures for welding and cutting.
18. Have a welder cut the strand end with a welding torch. The welder is to stand to the side of the strand while cutting. The welder is never to stand in front of the strand being cut.
19. Once the strand is cut, remove any strand remnants from the plastic conduit and prepare conduit for a new strand.
20. Dispose of salvage materials properly.
21. Be aware of pinch points and crushing hazards.
22. Take extra precautions to prevent heat and cold stress when working in extreme cold or hot temperatures.
23. Employees should wash hands before eating, drinking or smoking.

Related SOPS

General SOPS.....Chapter 10	Oxy-Acetylene Cutting/Welding.....11a-27
Hand Tools (Power and Manual)12B-13	Hoisting/Jacking11A-9
Bridge Jacking11B-11	Scaffolding.....12B-22

Post-Tensioning Strand Installation

Hazard Review

Moving Traffic	Welding/Cutting	Parking
Utilities	Lifting	Jacking
Slip, Trip and Fall	Scaffolding	Noise

1. Review Safe Operating Procedures for applicable equipment and perform operational checks.
2. Determine traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are required standard equipment.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Clear the work area of personnel who are not performing the post-tensioning strand-cutting operation. Have these personnel stand out of any trajectory path of either end of the strand being cut. Ensure that no bystanders are in the trajectory path of either end of the strand being cut.
8. Proper lifting techniques shall be used. Get help or use equipment if necessary.
9. Be aware of escape routes in case of emergency.
10. Be aware of loose materials, tripping hazards and other obstructions.
11. Allow ample space for each employee to work safely.
12. Locate all utilities in and near work site prior to commencing work.
13. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards cannot be avoided.
14. Keep walk spaces and work areas free from loose materials or tools.
15. Review MSDS for all hazardous materials being used or expected to encounter.
16. Grease new strand that is to be inserted into the plastic conduit. Grease shall not be applied in the areas of the recesses at the ends of the strands.
17. Place the greased strand into the plastic conduit and push the strand through the complete width of the bridge.
18. Install plates and strand vises at the ends of the strands at the recessed area.
19. Install the jacking equipment onto the strand and apply tension.
20. Cut the excess strand not under tension by using a torch or a comparable cutting device.
21. Seat the strand vise and remotely release by a hydraulic cable the tension applied by the jacking machine from the strand. Ensure that no personnel are standing in the trajectory path of the strand when the tension applied by the jacking machine is released.
22. Once the tension applied by the jacking machine is released, monitor the newly post-tensioned strand for 2 to 3 minutes before approaching the strand. This is to ensure that the tension load has properly transferred to the strand vise and plate assemblies.
23. Repack the recessed area around the post-tensioned strand ends with non-shrinking non-metallic grout.
24. Dispose of salvage materials properly.
25. Be aware of pinch points and crushing hazards.
26. Take extra precautions to prevent heat and cold stress when working in extreme cold or hot temperatures.
27. Employees should wash hands before eating, drinking or smoking.

Related SOPS

General SOPS.....Chapter 10	Oxy-Acetylene Cutting/Welding.....11a-27
Hand Tools (Power and Manual)12B-13	Hoisting/Jacking11A-9
Bridge Jacking11B-11	Scaffolding.....12B-22

Crack Sealing

Hazard Review

Moving Traffic	Moving Equipment	Hot/Flammable Material
Flying Particles	Temperature Extremes	Overcrowding of Workers
Slip, Trip and Fall		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
7. Keep fire extinguishers available at all times when using a fired kettle. Extinguishers should be on the other equipment, not the kettle.
8. Use caution when handling hot/flammable materials. Review MSDSs for each material used. Avoid direct contact.
9. Do not adjust burners or fill pour pots while kettle/distributor is in motion.
10. Allow ample space for each employee to work safely.
11. Be aware of flying sand, dust or other debris when blowing out cracks with compressed air. Eye protection must be worn. Be aware of wind direction and try to work upwind.
12. Use proper lifting and handling techniques when pouring cracks and shoveling blotting material.
13. Never leave a fired kettle unattended.
14. Before backing, make sure area is clear and use an observer when available.

Related SOPs

General SOPsChapter 10	Inmate Labor11B-42
Asphalt Distributor12A-1	Crew Cab and Flatbed Truck12A-29
Dump Truck12A-30	Air Compressor.....12B-1
Truck-Mounted Attenuator.....12B-2	Hand Tools (Power and Manual)12B-13
Trailers and Towed Equipment12B-29	

Demolition of Structure

Hazard Review

Falling Objects	Flying Objects	Swing Objects
Particles in Air		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Wear appropriate personal protective equipment consistent with hazard.
3. Keep an escape route cleared in case of emergencies.
4. Never wreck a structure which could cause another part to fall.
5. Allow plenty of room for a person to work.
6. Avoid cutting one end of a structure allowing it to swing.
7. Keep area where majority of work is being done clean enough to flee danger without stumbling or falling.
8. Keep dust and trash as minimal as possible.
9. Ensure that an asbestos inspection is made when there is suspicion of asbestos in the structure.

Related SOPs

General SOPsChapter 10	Explosives.....11E-3
Rigging.....11E-8	Crane/Dragline12A-4
Hand Tools (Power and Manual)12B-13	Ladder.....12B-15
Scaffolding.....12B-22	

Nuclear Density Inspection

Hazard Review

Lifting	Flying Particles	Moving Equipment
Slip, Trip and Fall	Burns	Propane
Radioactive Material	Heat Stress	Moving Traffic

1. Transport nuclear gauge in appropriate Type A labeled radioactive container. The gauge can not be transported in the passenger compartment of a vehicle. The gauge must be transported in a secured waterproof compartment.
2. Bill of lading must be carried in the cab of the vehicle transporting the gauge.
3. A source certificate identifying the radioactive materials in the gauge must be kept with the gauge.
4. Emergency contact numbers and emergency procedures must be kept with the gauge.
5. Nuclear gauge must be stored in a secured area and must be labeled "radioactive material."
6. Sign-out log must be kept in the nuclear gauge storage area.
7. Operator of the nuclear gauge must be certified to operate the nuclear gauge.
8. Operator shall be monitored for exposure to radiation. Film badge shall be worn at all times when transporting or working with the nuclear gauge.
9. Wear eye protection when driving pin for direct transmission rod.
10. Ensure that equipment operators and all concerned personnel on the job site are aware that a density test is being performed and the location of the density inspection on the job site. Use flasher, flag, cones, or drums to identify the location of the density gauge. Use a second person for a spotter if necessary.
11. Follow operation procedures and safety regulations established by Materials and Test Unit and the Radiation Protection Branch of the Department of Human Resources.

Related SOPs

General SOPs	Chapter 10	Inspection of New Structures	11B-44
Roadway Inspection	11B-63	Excavating, Trenching and Shoring.....	11E-2
Density Inspection	11B-17		

Density Inspection

Hazard Review

Lifting	Flying Particles	Moving Equipment
Slip, Trip and Fall	Burns	Propane
Heat Stress	Moving Traffic	

1. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
2. Wear appropriate personal protective equipment consistent with the hazard. Be aware of dust and small particles; eye protection is recommended.
3. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
4. Proper lifting techniques shall be used. Get help or use equipment if necessary.
5. Be aware of others when swinging pickax.
6. Be certain that propane tanks have been secured in off position. Ventilate area for 5 minutes before relighting blow pot.
7. Be aware of hot materials when drying moisture sample in frying pan.
8. Ensure that equipment operators and all concerned personnel on the job site are aware that a density test is being performed and the location of the density inspection on the job site. Use flasher, flag, cones, or drums to identify the location of the density gauge. Use a second person for a spotter if necessary.
9. Have a fire extinguisher available.
10. Be aware of the dangers of confined spaces.

Related SOPs

General SOPs	Chapter 10	Inspection of New Structures	11B-44
Roadway Inspection	11B-63	Excavating, Trenching and Shoring.....	11E-2
Nuclear Density Inspection.....	11B-17.1		

Drawbridge Maintenance

Hazard Review

Moving Traffic	Hazardous Materials	Parking
Communication Difficulties	Machinery	Electrical Shock
Slip, Trip and Fall	Confined Spaces	Noise

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, drop-off, tripping hazards and other obstructions. Keep walk spaces and work areas free from loose materials and tools.
10. Allow ample space for each employee to work safely. Be aware of other employees in the work areas.
11. Watch for poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high-top boots in suspect areas.
12. Be alert to protruding nails or spikes in decks and rails.
13. Review MSDS for all hazardous materials being used or expected to be encountered.
14. Dispose of waste materials properly.
15. Be aware of pinch points and crushing hazards.
16. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
17. Do not leave tools or materials in areas where vibration could cause them to fall.
18. Maintain communications between employees at all times.
19. Always lockout controls when working on machinery.
20. All electrical tools shall be properly grounded and insulated.

Related SOPs

General SOPsChapter 10	Bridge Jacking11B-11
Electrical Maintenance of Movable Span Bridges..11B-24	Electrical Maintenance of Navigational Lighting.....11B-25
Fender System Maintenance11B-28	Confined Space Entry11E-1
Lockout/Tagout.....11E-7	Scaffolding.....12B-22

Dredging (Construction Crew)

Hazard Review

Slips, Trips and Falls	Crushing Injuries	Moving Equipment
Lifting	Poisonous Plants/Insects/Snakes	Blowing Sand
Quicksand	Noise	Animals

1. Wear appropriate personal protective equipment consistent with the hazard.
2. Construction equipment shall be operated in a safe manner, as established in applicable training programs, manufacturers' guidelines and applicable Equipment Safe Operating Procedures.
3. When operating construction equipment, be alert for other people or obstructions in the immediate vicinity.
4. When necessary to jump-start equipment, use only those procedures approved by the equipment manufacturer.
5. When operating construction equipment, avoid any medications which cause drowsiness or which decrease alertness.
6. Be alert for quicksand and potential cave-ins near trenches.
7. Proper lifting techniques shall be used. Get help or use lifting equipment if necessary.
8. Maintain first aid kit at construction site.
9. Equipment operators should never work at a site alone. Also, keep two-way radio handy.
10. Use caution when working with dredge pipeline. Never position yourself or equipment under raised pipeline.
11. Use caution when working with pipeline fusing machine. Guard against contact with hot surfaces and sharp edges.
12. Post signs around spoils area to keep public away from the site.
13. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.

Related SOPs

General SOPs	Chapter 10	Borrow Pit, Waste Pit and Stockpiling Operations	11B-7
Dredging (Operations)	11B-20	Excavating, Trenching and Shoring	11E-2
Rigging	11E-8	Crane/Dragline	12A-4
Excavator, Hydraulic	12A-5	Front End Loader	12A-11
Crawler Tractor	12A-23		

Dredging (Operations)

Hazard Review

Moving Machinery Parts	Slip, Trip and Falls	Lifting
Drowning/Hypothermia	Crushing Injuries	Sharp-Edged Tools
Communication Difficulties	Fire	Noise
Unsecured Objects	Temperature Extremes	

1. Wear appropriate personal protective equipment consistent with the hazard. Hearing protection shall be worn in designated areas. Personal Floatation Device shall be worn when working in areas where slips, trips and falls would likely result in falling overboard. Protective gloves shall be worn when handling cable.
2. Be aware of loose objects, slippery decks, tripping hazards, uneven deck coatings, “headbangers” and other obstructions. Always use handrails when ascending or descending ladders.
3. Proper lifting techniques shall be used. Get help or use lifting equipment if necessary.
4. Confined spaces must be well ventilated prior to entry and checked by a certified competent person. Never enter a confined space without a standby observer.
5. Never leave doors ajar. Doors should be securely closed or hooked in the opened position. Be mindful of stress on doors due to either created vacuum or high wind.
6. Ensure shore connections are de-energized before connecting shore power. Before using portable power tools, inspect for frayed or cut wiring, loose connections and proper grounding.
7. Provide adequate ventilation when cleaning with chemicals or painting.
8. Always stand on rubber padding when working around switchboards.
9. Be alert for falling or shifting objects during heavy weather conditions.
10. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
11. When working with dredge pipeline, never position yourself or equipment under the raised pipeline.
12. Use caution when working with pipeline fusing machine. Guard against contact with hot surfaces and sharp edges.

Related SOPs

General SOPsChapter 10	Dredging (Construction Crew)11B-19
Ferry Engineering11B-29	Tug Operations.....11B-78
Confined Space Entry.....11E-1	High Pressure Hoses11E-5
Lockout/Tagout.....11E-7	Rigging.....11E-8
Hand Tools (Power and Manual)12B-13	

Drift Removal

Hazard Review

Traffic	Unstable Footing	Swinging Objects
Communication Difficulties	Drowning	Rigging
Slip, Trip and Fall	Crushing	Hidden Hazards

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, tripping hazards and unstable footing on brush, logs and other drift material. Keep walk spaces and work areas free from loose materials or tools.
10. Allow ample space for each employee to work safely. Be aware of other employees in the work areas.
11. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
12. Review MSDS for all hazardous materials being used or expected to be encountered.
13. Dispose of waste materials properly. Use gloves when handling treated lumber.
14. Be aware of pinch points and crushing hazards.
15. Employees should wash hands before eating, drinking or smoking.
16. Do not leave tools or materials in areas where vibration or wave action could cause them to fall.
17. Maintain communications between employees at all times.
18. Be alert to swinging loads and loads suddenly being snatched due to tensile load from cable and winch.
19. Be aware that swift-moving currents can cause a sudden increase in load on cable and boom if attached to material that breaks free from the drift pile.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
Rigging.....	11E-8	Crane/Dragline	12A-4
Backhoe and Loader	12A-22	Crane Truck.....	12A-28
Work Boat	12A-37	Hand Tools (Power and Manual)	12B-13

Drilled Shaft Inspection

Hazard Review

Hazardous Atmospheres	Casing Integrity	Crane Operation
Moving Equipment	Falling Objects	Cave In

1. Be cautious when working near moving construction equipment.
2. Rock and soil materials should be removed from the shaft in containers designed to resist tipping. Buckets and other containers used to remove spoil materials must not be overloaded. Spoil materials and all excavated and loose material should always be piled at least 2 feet away from the shaft surface opening or the edge of the excavation.
3. The shaft should be cased from the ground elevation to near the bottom of the excavation. The casing should be no smaller than 12 inches (preferably 6 inches) less than the shaft diameter and no smaller than 30 inches in diameter. It should be verified that the casing is thick enough to prevent buckling under soil and water pressure.
4. Wear appropriate clothing and personal protective equipment (such as hard hats and steel-toe safety shoes). No loose or flowing clothing is allowed. Hearing protection must be worn by down-hole personnel where the use of mechanical or electrical equipment in the shaft generates high noise levels.
5. The person being lowered into the hole should be lowered in a safe, slow and controlled fashion by means of a safety harness attached to a safety line. Lowering should be stopped when the individual being lowered signals or when the individual indicates that the bottom of the shaft has been reached (either by using predetermined signalling methods or two-way radio communication).
6. Personnel working in drilled shaft excavations should never disengage themselves from the safety harness.
7. If a frame or boom is used for hoisting, the apparatus should be placed securely over the shaft. The person entering the shaft should mount the personnel carrier adjacent to the shaft after having a safety harness secured to the designated point of connection.
8. If a crane is used, the personnel carrier should be attached to the load line, then positioned near the shaft opening, but not over it. Personnel entering the shaft should mount the carrier after having the safety belt or harness attached to the designated point. The personnel carrier then should be positioned over the hole. The crane should have an automatic safety catch on the lifting cable.
9. A safety rope, attached to a secured stationary object and lowered into the hole, should always be present for personnel to hold in case of failure of the primary hoisting device. A safety rope should always be in reach of the personnel in the shaft.
10. Equipment should be lowered/lifted from out of the shaft prior to personnel whenever possible. Personnel should be handed all equipment which can be lowered safely into the shaft during personnel entry or at the direction of down-hole personnel.
11. Air powered equipment should be pinned or secured so that there is no danger of the release of high pressure air lines while personnel are in the shaft.
12. Dewatering should continue as necessary during down-hole operations. A shaft with water in it shall be entered only if the shaft casing is adequate to prevent cave-ins and/or if equipment is available to remove accumulating water. Surface water should be prevented from entering the excavation. If water cannot be removed from the shaft, then alternative means of inspecting the shaft (such as a remote camera) should be used.
13. Machines that produce exhaust should not be operated in the vicinity of the shaft during the inspection.
14. Both prior to and during down shaft inspection activities, the atmospheric conditions will be monitored by a qualified person using a multi-gas detector. This multi-gas gas detector must detect the level of oxygen, flammables/combustibles and toxics. If the down shaft atmospheric conditions are not at safe levels, the shaft should be ventilated, or respiratory protection equipment should be worn, or the shaft should not be entered.
15. Any welding or heating activities should be prohibited during drilled shaft inspections. Welding should not be conducted in or around shafts where combustible gases have been detected until ventilation or other remedial measures have reduced concentrations of contaminants to below safe levels.
16. After work in the shaft has been completed, personnel should be raised in a slow and controlled fashion.

Related SOPs

General SOPs.....Chapter 10	Confined Space Entry11E-1
Excavating, Trenching and Shoring11E-2	Crane/Dragline.....12A-4
Welding, Arc.....11A-40	Oxy-Acetylene Cutting/Welding.....11A-27

Earth Moving

Including Grading on Existing Shoulder

Hazard Review

Moving Equipment	Poisonous Plants/Snakes/Insects	Noise
Slip, Trip and Fall	Suspended Loads	Utilities
Moving Traffic	Explosives	Temperature Extremes
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Locate all utilities in and near the work site prior to commencing work. Call ULOCO.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment. Avoid areas behind equipment.
7. Be aware of escape routes in case of emergency. It is a good practice to work facing oncoming traffic while on foot.
8. Allow ample space for each employee to work safely.
9. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
11. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
12. Strictly adhere to departmental policy regarding handling of explosives. Utilize licensed specialists in this operation.
13. Avoid walking and working under suspended loads. Wear hard hat when working around backhoes, cranes, excavators, etc.
14. Before backing, make sure area is clear and use an observer when available.

Related SOPs

General SOPs	Chapter 10	Borrow Pit, Waste Pit and Stockpiling Operations	11B-7
Hand Removal of Vegetation	11B-40	Pipe Installation	11B-54
Rip Rap Installation/Removal	11B-61	Tree Felling.....	11B-77
Explosives.....	11E-3	Broom	12A-3
Excavator, Hydraulic.....	12A-5	Grader.....	12A-7
Force Feed Loader	12A-10	Front End Loader	12A-11
Sheep-Foot/Rubber-Tired/Vibratory Rollers	12A-17	Scraper.....	12A-19
Backhoe and Loader	12A-22	Crawler Tractor.....	12A-23
Wheel Tractor	12A-25	Dump Truck.....	12A-30
Chain Saw and All-Purpose Cut-Off Saw	12B-4	Hand Tools (Power and Manual)	12B-13
Trailers and Towed Equipment	12B-29		

Electrical Maintenance of Movable Span Bridges

Hazard Review

Moving Traffic	Lifting	Parking
Toxic Materials	Electrical Shock	Slip, Trip and Fall

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Whenever possible, perform work while facing traffic.
7. Do not work over rails or bridge structures without being properly secured.
8. When servicing batteries be aware of hazards due to toxic gas or liquid exposure. Always wear hand and eye protection.
9. When working at night, have adequate lighting available.
10. Always use proper testing equipment and procedures.
11. Always use radios or two way communication for electrical maintenance involving bridge operation.
12. Review MSDS for all hazardous materials being used or expected to be encountered.
13. Plan and conduct trouble shooting and maintenance to minimize traffic interruption and risks.
14. Keep bridge operators briefed at all times as to status of maintenance/trouble shooting.
15. Employees should wash hands before eating, drinking or smoking.
16. Always lockout and tag controls before performing any maintenance or repairs on draw span machinery.

Related SOPs

General SOPs	Chapter 10	Electrical Installation/Repairs	11A-4
Drawbridge Maintenance	11B-18	Electrical Maintenance of Navigational Lighting.....	11B-25
Lockout/Tagout.....	11E-7	Snooper Crane	12A-20
Hand Tools (Power and Manual)	12B-13	Ladder.....	12B-15

Electrical Maintenance of Navigational Lighting

Hazard Review

Moving Traffic	Parking	Toxic Materials
Electrical Shock	Slip, Trip and Fall	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard: Hard hats, safety shoes, safety glasses, life preservers and safety lanyards when needed.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Whenever possible, perform work while facing traffic.
7. Do not work over rails or bridge structures without being properly secured.
8. When servicing batteries be aware of hazards due to toxic gas or liquid exposure. Always wear hand and eye protection.
9. When working at night, have adequate lighting available.
10. Always use proper testing equipment and procedures.

Related SOPs

General SOPsChapter 10	Electrical Installation/Repairs 11A-4
Drawbridge Maintenance 11B-18	Electrical Maintenance of Movable Span Bridges..... 11B-24
Lockout/Tagout..... 11E-7	Hand Tools (Power and Manual) 12B-13
Ladder..... 12B-15	

Environmental Assessment Activities

Hazard Review

Hazardous Materials	Toxic Chemicals	Airborne contaminants
Unknown/Unlabeled Substances	Traffic	Overhead Loads
Moving Equipment	Slip, Trip and Fall	Temperature Extremes
Confined Space	Stockpile/Trench Collapse	

1. All posted MSDSs should be read and followed.
2. Wear appropriate personal protection equipment consistent with the hazard. Protective clothing, respirators and other equipment may be required.
3. Avoid working under suspended loads. Wear hard hats around backhoes, cranes and excavators.
4. Evaluate site and follow Excavation, Trenching and Shoring Standards.
5. All employees shall be trained in the proper procedures for handling hazardous materials.
6. All employees must follow established procedures for entering confined spaces.
7. Beware of containers with unknown and/or unlabeled substances. Accidental mixing of waste materials could cause a chemical reaction resulting in fire, explosion or atmospheric release of toxic vapors. Be alert for heat buildup, vapors, rumbling noises, leaks, dampness, unusual debris and strange odors caused by airborne contaminants.
8. Park in areas that: provide safe entrance and exit of work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers entering and exiting the vehicle.
9. Employees on foot must use caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
11. Take extra precautions to prevent heat and cold stress when working in extremely hot and cold temperatures.
12. Be aware of escape routes in case of emergency.
13. All work should be performed in well ventilated areas.

Related SOPs

General SOPs	Chapter 10	Confined Space Entry	11E-1
Excavating, Trenching and Shoring	11E-2	Hazardous Waste Handling and Storage	11E-4

Fence Installation and Maintenance

Hazard Review

Moving Traffic	Moving Equipment	Slip, Trip and Fall
Loose Ends of Wire and Fabric	Overcrowding of Workers	Poisonous Plants/Snakes/Insects
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Be aware of escape routes in case of emergency. It is a good practice to work facing oncoming traffic while on foot.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
7. Allow ample space for each employee to work safely.
8. Be alert to wire and posts that are under tension.
9. Be alert to sharp or jagged edges and splinters when handling fence posts and wire. Gloves are recommended.
10. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
11. Employees should wash hands before eating, drinking or smoking.
12. Avoid walking and working under suspended loads. Wear hard hat when working around equipment.

Related SOPs

General SOPs	Chapter 10	Earth Moving	11B-23
Hand Removal of Vegetation	11B-40	Inmate Labor	11B-42
Tree Felling.....	11B-77	Post Driver.....	12A-15
Backhoe and Loader	12A-22	Crew Cab and Flatbed Truck.....	12A-29
Chain Saw and All-Purpose Cut-Off Saw	12B-4	Hand Tools (Power and Manual)	12B-13
Tractor Attachments	12B-28		

Fender System Maintenance

Hazard Review

Water Traffic	Climbing	Parking
Communication Difficulties	Drowning	Rigging
Slip, Trip and Fall	Crushing	Confined Spaces

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely. Be aware of other employees in the work areas.
11. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
12. Be alert to protruding nails or spikes in decks and rails.
13. Keep walk spaces and work areas free from loose materials or tools.
14. Review MSDS for all hazardous materials being used or expected to be encountered.
15. Dispose of waste and salvage materials properly. Use gloves when handling treated lumber.
16. Be aware of pinch points and crushing hazards.
17. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
18. Employees should wash hands before eating, drinking or smoking.
19. Do not leave tools or materials in areas where vibration or wave action could cause them to fall.
20. Maintain communications between employees at all times.
21. All electrical tools shall be properly grounded and insulated.

Related SOPs

General SOPs	Chapter 10	Oxy-Acetylene Cutting/Welding	11A-27
Arc Welding.....	11A-40	Pile Driving.....	11B-53
Rigging.....	11E-8	Crane/Drumline	12A-4
Work Boat.....	12A-37	Hand Tools (Power and Manual)	12B-13
Scaffolding.....	12B-22		

Ferry Engineering

Hazard Review

Noise	Pressurized Systems	Slip, Trip and Fall
Electrical Shock	Hot Surfaces	Fire
Moving Machinery Parts	Confined Spaces	Unsecured Objects

1. Wear appropriate personal protective equipment consistent with the hazard. Eye protection shall be worn when working on batteries. Hearing protection shall be worn in designated areas. Personal Floatation Device shall be worn when working in areas where slips, trips, or falls would likely result in falling overboard.
2. Be aware of loose objects, slippery decks, tripping hazards, uneven deck coamings, “headbangers” and other obstructions. Always use handrails when ascending or descending ladders.
3. Proper lifting techniques shall be used. Get help or use equipment if necessary.
4. Confined spaces must be well ventilated prior to entry and checked by a certified competent person. Never enter a confined space without a standby observer.
5. Never leave doors ajar. Doors should be securely closed or hooked in the opened position. Be mindful of stress on doors due to either created vacuum or high wind.
6. Ensure shore connections are de-energized before connecting shore power. Before using portable power tools, inspect for frayed or cut wiring, loose connections and proper grounding.
7. Provide adequate ventilation when cleaning with chemicals or painting.
8. Always stand on rubber padding when working around switch boxes or electrical panels.
9. Be alert for falling or shifting objects during heavy weather conditions.
10. Check pressurized piping, hoses, tanks, steering systems, etc. for unsafe conditions prior to work. De-energize, de-pressurize and/or exercise systems prior to repair. If in doubt, consult supervisor.
11. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
12. Read product labels, MSDSs and manufacturer’s labels before handling chemicals. Hazardous materials should be properly stored and must be in accordance with manufacturer’s guidelines.

Related SOPs

General SOPs	Chapter 10	Ferry Operations.....	11B-31
Tug Operations.....	11B-78	Confined Space Entry	11E-1
High Pressure Hoses.....	11E-5	Lockout/Tagout.....	11E-7
Hand Tools (Power and Manual)	12B-13		

Ferry Field Maintenance

Hazard Review

Moving Machinery Parts	Slip, Trip and Fall	Sharp Edged Tools
Fire	Hot Surfaces	Noise
Pressurized Systems	Confined Spaces	Electrical Shock

1. Wear appropriate personal protective equipment consistent with the hazard. Hearing protection shall be worn in designated areas.
2. Proper lifting techniques shall be used. Get help or use equipment if necessary.
3. Confined spaces must be well ventilated prior to entry and checked by a certified competent person. Never enter a confined space without a standby observer.
4. Be aware of loose objects, slippery decks, tripping hazards, uneven deck coamings, “headbangers” and other obstructions. Always use handrails when ascending or descending ladders.
5. Always stand on rubber padding when working around switch boxes and electrical panels.
6. Accessory equipment (welders, forklifts, boom truck, etc.) shall be operated in a safe manner as established in applicable training programs and manufacturer’s guidelines.
7. When using compressed air for cleaning, never bypass or alter the pressure reducing system.
8. Use the right tool for the job. Replace worn or broken tools such as cracked hammer handles and mushrooming chisel heads. Never surpass the pneumatic tool's recommended air pressure.
9. Read product labels, MSDSs and manufacturer’s labels before handling chemicals. Hazardous materials should be properly stored and must be in accordance with manufacturer’s guidelines.
10. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
11. When cleaning parts, use only approved cleaning materials with good ventilation.
12. Check pressurized piping, hoses, tanks, steering systems, etc. for unsafe conditions prior to work. De-energize, de-pressurize and/or exercise systems prior to repair.

Related SOPs

General SOPs	Chapter 10	Oxy-Acetylene Cutting/Welding	11A-27
Sandblasting.....	11A-32	Warehouse.....	11A-39
Arc Welding.....	11A-40	Ferry Engineering.....	11B-29
Ferry Operations.....	11B-31	Confined Space Entry	11E-1
Hazardous Waste Handling and Storage	11E-4	High Pressure Hoses	11E-5
Lockout/Tagout.....	11E-7	Forklift	12A-6
Crane Truck.....	12A-28	Air Compressor.....	12B-1
Hand Tools (Power and Manual)	12B-13		

Ferry Operations

Hazard Review

Slip, Trip and Fall	Adverse Weather	Drowning / Hypothermia
Confined Spaces	Fire	Mooring Lines
Moving Traffic	Power/Hand Tools	Unsecured Objects

1. Wear appropriate personal protective equipment consistent with the hazard. Hearing protection shall be worn in designated areas. Personal Flotation Devices shall be worn when working in areas where slips, trips, or falls would likely result in falling overboard. Protective gloves shall be worn when handling cable.
2. Be aware of loose objects, slippery decks, tripping hazards, uneven deck coamings, "headbangers" and other obstructions. Always use handrails when ascending or descending ladders.
3. Proper lifting techniques shall be used. Get help or use equipment if necessary.
4. Confined spaces must be well ventilated prior to entry. Never enter a confined space without a standby observer.
5. Use caution around mooring lines. Never stand in the bight of a line. Stand well clear of mooring lines which are under heavy stress.
6. Never stand in position where you can be injured by moving vehicles. Be alert for non-attentive drivers. To ensure safe work zone, advise passengers to remain in vehicles until ferry is under way.
7. Never leave doors ajar. Doors should be securely closed or hooked in the opened position. Be mindful of stress on doors due to either created vacuum or high wind.
8. Before using portable power tools, inspect for frayed or cut wiring, loose connections and proper grounding.
9. Provide adequate ventilation when painting or when cleaning with chemicals.
10. Be alert for falling or shifting objects during heavy weather conditions.
11. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.

Related SOPs

General SOPs	Chapter 10	Ferry Engineering	11B-29
Tug Operations	11B-78	Lockout/Tagout	11E-7
Hand Tools (Power and Manual)	12B-13		

Ferry Shore Facilities

Hazard Review

Slip, Trip and Fall	Moving Traffic	Crushing Injuries
Lifting	Power/Hand Tools	Flying Particles
Non-DOT Personnel	Electrical Shock	Fire

1. Never stand in position where you can be injured by moving vehicles. Be alert for non-attentive drivers.
2. Wear appropriate personal protective equipment consistent with the hazard. Wear safety toe shoes when mowing and wear eye protection and face shield when using string trimmer. Personal Flotation Devices shall be worn when working in areas where slips, trips or falls would likely result in falling overboard. Wear reflective vests at all times when handling traffic.
3. Use appropriate tools or equipment where applicable (such as: use stepladder to reach top shelf items in supply room).
4. Proper lifting techniques shall be used. Get help or use lifting equipment if necessary.
5. Read product labels, MSDSs and manufacturer's labels before handling chemicals. Hazardous materials should be properly stored and must be in accordance with manufacturer's guidelines.
6. Provide adequate ventilation when painting or when cleaning with chemicals.
7. Before using portable power tools, inspect for frayed or cut wiring, loose connections and proper grounding.
8. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.

Related SOPs

General SOPs	Chapter 10	Ferry Operations.....	11B-31
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Field Surveying

Hazard Review

Parking	Moving Equipment	Slip, Trip and Fall
Extreme Temperatures	Poisonous Plants/Insects/Snakes	Lifting
Moving Traffic	Animals	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles. The use of flashers and strobe lights is recommended to alert oncoming traffic.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary (lifting and carrying EDM and supplies).
7. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions. Newly seeded areas are especially hazardous. Shoulders could be slick due to wetness or thawing.
8. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
9. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot. Remain alert to oncoming traffic for yourself as well as other crew members.
10. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
11. Do not leave equipment, such as tripods, unattended when positioned in roadway or adjacent thereto.
12. Use of radios may speed work, reduce traffic delay and improve safety in high traffic areas. Consider working during off peak hours.
13. Take extra precautions when sharpening hand tools. Use gloves and shields on files to protect hands.
14. When driving stakes and cutting brush, ensure a clear distance from coworkers. Use extra caution to avoid hitting leg, foot or other employees.

Related SOPs

General SOPs	Chapter 10	Hand Removal of Vegetation	11B-40
Chain Saw and All-Purpose Cut-Off Saw	12B-4	Hand Tools (Power and Manual)	12B-13

Geographic Hazards

Hazard Review

Mountain Climbing	Swamp Lands	Woodlands
Poisonous Snakes/Insects	Animals	

1. Wear appropriate personal protective equipment consistent with the hazard.
2. Be alert for tripping hazards such as loose rocks, logs, hidden objects, holes and uneven ground.
3. When climbing or rapelling always have a companion along.
4. Inspect safety lines and equipment prior to rapelling.
5. Supervisors shall ensure that employees who use rapelling equipment have the necessary training.
6. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. Wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
7. Be aware of sink holes and quick sand areas in swamps and coastal plain areas.
8. Be cautious of dead trees and limbs in wooded areas.
9. Be aware of deer and big game hunters during the hunting season. The use of bright orange traffic vests or blaze orange clothing is recommended when working in wooded areas during hunting seasons.

Related SOPs

General SOPsChapter 10

Geotechnical Drilling Operations

Hazard Review

Moving Machinery Parts	Cathead Operation	Slippery Surfaces
Buried and Overhead Utilities	Moving Equipment	Uneven Terrain
Drill Rod Stacking	Noise	Poisonous Plants/Snakes/Insects
Lifting	Adverse Weather Conditions	Overhead Problems
Winching	Animals	

1. Wear appropriate personal protective equipment consistent with the hazard.
2. Avoid contact with rotating drilling equipment.
3. When cathead is in use, assure a safe travel path for the rope by using proper technique. Avoid standing on the rope.
4. Observe and stay clear of overhead utility lines. Have underground utilities properly located prior to drilling.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching the equipment.
6. Be aware of drop-offs, uneven ground and hidden objects which may cause loss of control when maneuvering drill rigs or create unstable drill set-ups. In heavily wooded terrain, the need for a scout may be necessary to locate hidden obstacles.
7. Drill rod stacking must not exceed a length of 1.5 times the height of the tower.
8. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. Wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided. Proper first aid and insect repellents should accompany field crews.
9. A combination of conditions can lead to slippery surfaces. High groundwater conditions resulting in muddy soils brought to the surface by augers as well as the utilization of bentonite drilling fluid are the predominant problem areas. Be alert for these conditions!
10. Inspect all cables and clamps prior to winching operation. Stand clear of winching operation.
11. Use proper lifting techniques. Get help or use lifting equipment, if necessary.
12. Drilling operations should be suspended immediately during electrical storms.
13. Be aware of overhead problems which may come in contact with drill rig when moving or setting up equipment.
14. Review daily operations checklist to ensure that equipment is working properly. Make special note of emergency KILL switches.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
Rigging.....	11E-8	Geotechnical and Trailer Truck.....	12A-33
Trailers and Towed Equipment	12B-29		

Geotechnical Roadside Operations

Hazard Review

Overcrowding of Workers	Moving Traffic	Moving Equipment
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1. Determine the traffic control needs from the Work Zone Safety Handbook.
2. Wear appropriate personal protective equipment consistent with the hazard. Safety vests are essential when working in close proximity to traffic.
3. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
4. Allow ample space for each employee to work safely and stay out of the traffic zone.
5. Park in areas that: provide safe entrance and exit of work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers entering and exiting the vehicle.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching the equipment.

Related SOPs

General SOPsChapter 10	Rigging.....11E-8
Geotechnical and Trailer Truck12A-33	Trailers and Towed Equipment.....12B-29

Geotechnical Barge Operations

Hazard Review

Drowning/Hypothermia	Crane Operation	Slip, Trip and Fall
Noise	Adverse Weather Conditions	Winching

1. Wear personal protective equipment consistent with the hazard.
2. Be aware of slippery decks, tripping hazards and loose objects. Personal Floatation Devices will be worn when working on barge since slips, trips and falls would likely result in falling overboard.
3. Always use qualified signal man with crane operation. Inspect cables and clamps to ensure that they are in good working condition and they meet OSHA requirements.
4. Be alert for crushing injuries.
5. Barge operations shall be suspended immediately in the event of an electrical storm. Be alert for falling or shifting objects during heavy weather conditions.
6. Inspect all cables and clamps prior to winching operation. Stand clear of winching operation.
7. Proper lighting should be used to alert nighttime boaters of the barge operation. Lighting should meet U. S. Coast Guard and U. S. Fish and Wildlife Standards.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
Rigging.....	11E-8		

Grouting Operations

Hazard Review

Pressurized Hoses	Moving Traffic	Moving Machinery Parts
Noise	Slip, Trip and Fall	Uneven Terrain
Lifting	Moving Equipment	

1. Wear appropriate personal protective equipment consistent with the hazard. Eye and ear protection should be worn around pressurized hoses. Breathing masks should be worn during the mixing operation to prevent dust inhalation.
2. Be aware of loose material, lines and hoses, excavation drop-offs, uneven and sloping ground and other obstructions.
3. Avoid contact with mixers, paddles and belts while in operation.
4. Determine the traffic control needs from the Work Zone Safety Handbook.
5. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment in the work area; and provide maximum protection for workers getting in and out of the vehicles.
6. Be aware of escape routes in case of emergency. It is a good practice to work facing oncoming traffic while on foot.
7. Employees on foot must use caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
8. Review Safe Working Procedures for applicable equipment and perform pre-operational checks.
9. Proper lifting techniques should be used. Get help or use equipment if necessary.
10. Allow ample space for each employee to work safely.

Related SOPs

General SOPs	Chapter 10	High Pressure Hoses	11E-5
Truck Tractor and Trailer	12A-36		

Guardrail Installation/Maintenance

Hazard Review

Moving Traffic	Heavy Materials	Slip, Trip and Fall
Moving Equipment	Overcrowding of Workers	Poisonous Plants/Snakes/Insects
Cutting/Welding Galvanized Materials	Lifting	Crushing
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
6. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
7. Have fire extinguishers available when welding/cutting.
8. Do not use a welder or torch on guardrail without a proper respirator since galvanized materials contain zinc and will release poisonous gases.
9. Be alert to sharp or jagged edges, burrs and splinters when handling guardrail and posts, especially that which has been damaged. Gloves are required when handling these materials.
10. Be aware of loose material, excavation drop-offs, tripping hazards, uneven ground and other obstructions.
11. Allow ample space for each employee to work safely.
12. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
13. Proper lifting techniques shall be used. Get help or use equipment if necessary.
14. Be aware of crushing hazards and pinch points when fastening or handling guardrail. Use a pry bar to align holes.
15. Work from back side of guardrail when removing rail from posts.

Related SOPs

General SOPs	Chapter 10	Oxy-Acetylene Cutting/Welding	11A-27
Arc Welding.....	11A-40	Post Driver	12A-15
Crew Cab and Flatbed Truck	12A-29	Hand Tools (Power and Manual)	12B-13
Tractor Attachments	12B-28		

Hand Removal of Vegetation

Hazard Review

Chain Saws	Sharp Edged Tools	Poisonous Plants/Snakes/Insects
Thorns	Unwieldy Brush	Slip, Trip and Fall
Overcrowding of Workers	Moving Equipment	Utility Lines
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hearing and eye protection are required when using chain saws or chippers. Use of worker leg protection is recommended when operating chain saw.
5. Cut and stack brush in manageable pieces that are easily handled to avoid back injuries.
6. Utilize appropriate mechanical means when moving large quantities of brush.
7. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
8. Allow ample space for each employee to work safely. Don't bunch up.
9. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
10. Chain saw and chipper operators must be trained and qualified.
11. Use caution when handling tools with sharp edges. Gloves are required when sharpening tools.
12. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
13. Do not cut limbs that may contact overhead utility lines. Observe and stay clear of overhead utilities.
14. Tree-trimming which would require climbing shall only be performed by a specialist or with the assistance of a bucket truck.
15. Use extreme care when cutting trees, brush, etc. that are under stress, e.g., ice conditions.

Related SOPs

General SOPs	Chapter 10	Aerial Device Truck	12A-26
Crew Cab and Flatbed Truck	12A-29	Brush Chipper	12B-3
Chain Saw and All-Purpose Cut-Off Saw	12B-4		

Herbicide and other Spraying Operations

Hazard Review

Moving Traffic	High Pressure Hoses	Uneven Ground
Slip, Trip and Fall	Restricted-Use Chemicals	Temperature Extremes
Moving Equipment	Poisonous Plants/Insects/Snakes	Animals

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook. The use of a shadow vehicle with crash attenuator is recommended for high volume and/or high-speed roadways.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Wear all additional equipment required by chemical label and U.S. Department of Agriculture. Impermeable gloves, boots, coveralls and face shields are required when handling pesticides.
5. Refer to instructions for applying or mixing chemicals.
6. Read product labels, MSDSs and pest control recommendations before handling chemicals. The documents are required to be at application site.
7. Make sure soap and water are available at work site.
8. Do not exceed recommended pressure, check for wear and tear on hoses, and make sure pressure regulator is working. Test pump and system and calibrate prior to adding chemicals.
9. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
11. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
12. When operating spray trucks off roadway, be aware of hidden objects in grass and unstable terrain.
13. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
14. Be aware of escape routes in case of emergency.
15. Before backing make sure area is clear and use an observer when available.

Related SOPs

General SOPs	Chapter 10	Hazardous Waste Handling and Storage	11E-4
Wheel Tractor	12A-25	Crew Cab and Flatbed Truck	12A-29
Herbicide Truck.....	12A-34	Fumigation (Gassing) Rig	12B-11
Tractor Attachments	12B-28		

Inmate Labor

Hazard Review

Poisonous Plants, Snakes and Insects	Moving Traffic	Hazardous Materials
Moving Equipment	Slip, Trip and Fall	Temperature Extremes

1. Inmates should be supervised only by employees who have been trained and designated by the N.C. Department of Correction as a Custodial Agent.
2. Supervisors should be aware of security requirements.
3. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
4. Determine the traffic control needs from the Work Zone Safety Handbook.
5. Traffic control needs for medium custody inmate labor operations is the responsibility of the N.C. Department of Correction.
6. Inmates used as flagmen should be trained in proper flagging procedures. They should also be equipped with safety vests or orange shirts, and orange hats or hard hats with orange covers.
7. Supervisors shall verify that inmates are capable and qualified on each type of equipment before allowing the equipment to be operated.
8. No inmate shall be allowed to ride anywhere except in the cab when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
9. Inmates shall wear seat belts and/or shoulder harnesses as provided.
10. When entering or exiting equipment, use steps and handholds provided. Do not jump from vehicle.
11. Inmates should be trained in the use of shop tools and equipment before using same.

Related SOPs

General SOPsChapter 10	Tree Felling.....11B-77
Crew Cab and Flatbed Truck12A-29	Chain Saw and All-Purpose Cut-Off Saw.....12B-4
Hand Tools (Power and Manual)12B-13	

Inspection of Existing Bridges

Hazard Review

Moving Traffic	Hazardous Materials	Parking
Utilities	Lifting	Slip, Trip and Fall
Poisonous Plants/Insects/Snakes	Animals	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment. Use climbing safety harness and lanyards when using over-the-rail ladders and when doing similar activities. Life jackets may also be required.
5. Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions. Keep walk spaces and work areas free from loose materials or tools.
10. Be sure there is firm footing and sound bottom when in water.
11. Allow ample space for each employee to work safely.
12. Locate all utilities in and near work site prior to beginning inspection.
13. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
14. Be alert to protruding nails or spikes in decks and rails.
15. Review MSDS for all hazardous materials being used or expected to be encountered.
16. Review manufacturer's recommended guidelines for proper use of ladder.
17. Be aware of pinch points and crushing hazards.
18. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
19. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPs	Chapter 10	Snooper Crane	12A-20
Crane Truck	12A-28	Work Boat	12A-37
Hand Tools (Power and Manual)	12B-13	Trailers and Towed Equipment.....	12B-29

Inspection of New Structures

Hazard Review

Parking	Personal Protective Equipment	Moving Equipment
Slip, Trip and Fall	Open Excavations	Overhead Loads
Explosives	Temperature Extremes	Poisonous Snakes/Plants/Insects
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Check to ensure signing and traffic control is in accordance with project traffic control plans.
3. Park in areas that: provide safe entrance and exit of the area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard, i.e., visibility, noise, dust.
5. Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
6. Be aware of guidelines for proper trenching and excavation. Do not enter areas inadequately protected from cave-ins.
7. Be aware of contractor's timetable when he is using explosives. Review MSDS for concrete.
8. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
9. Proper lifting techniques shall be used. Get help or use equipment if necessary. Exercise caution when carrying buckets filled with concrete.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions. Use caution on catwalks, beams, girders and scaffolding. Use extra caution when walking on epoxy-coated steel.
11. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
12. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures. Reflection of sun from concrete intensifies force. Use proper sunscreen.
13. When performing inspection duties, note the location and proximity of construction equipment. If working in equipment blind spots, make sure contractor's personnel know you are there.

Related SOPs

General SOPs	Chapter 10	Scaffolding.....	12B-22
Pile Driving	Page 11B-53	Excavating, Trenching and Shoring.....	11E-2

Installation of Paint Lines

(Including Prelining And Hand Layout)

Hazard Review

Moving Traffic	Slip, Trip and Fall	Moving Equipment
Lifting	Paint and Exhaust Fumes	Sun Exposure

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook. The use of a shadow vehicle with crash attenuator is recommended for high volume and/or high speed roadways.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicle/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of escape routes in case of emergency.
8. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
9. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
10. Schedule operations to avoid work on high volume roads during peak traffic conditions.
11. Establish painting plan and review this with entire crew before beginning operation.
12. Paint only when visibility is good.
13. Wear mask and face shield, goggles or safety glasses when performing maintenance on paint guns.

Related SOPs

General SOPs	Chapter 10	Centerline Paint Machine	12A-12
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Lime/Cement Stabilization

Hazard Review

Pressurized Hoses	Moving Machinery Parts	Hot Surfaces
Moving Equipment	Noise	Slip, Trip and Fall
Lifting	Caustic Materials	

1. Wear appropriate personal protective equipment consistent with the hazard. Eye and breathing protection should be worn around lime spreading operations.
2. Be aware of loose material, uneven ground, lines and hoses and other obstructions.
3. Avoid contact with moving machinery parts such as lime spreaders and mixers while in operation.
4. Be alert for sprayed slurry mixes from pressurized systems.
5. Avoid contact with mixers which build up high temperatures that can cause severe burns.
6. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment in the work area; and provide maximum protection for workers getting in and out of the vehicles.
7. Employees on foot must use caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
8. Review Safe Working Procedures for applicable equipment and perform pre-operational checks.
9. Proper lifting techniques should be used. Get help or use equipment if necessary.
10. Be aware that when caustic materials such as quick lime comes in contact with bare skin and/or eyes it can cause severe burns. Avoid contact through caution and use of proper clothing.

Related SOPs

General SOPS.....Chapter 10

Maintenance Stabilization of Unpaved Roads

Hazard Review

Moving Traffic	Slip, Trip and Fall	Blowing Fines
Flying Particles	Moving Equipment	Utility Lines
Noise	Uneven Terrain	Temperature Extremes

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Avoid walking or working under suspended loads.
4. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicle.
5. Wear appropriate personal protective equipment consistent with the hazard.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Avoid areas behind operating equipment.
7. Observe and stay clear of overhead utility lines.
8. Be aware of loose material, excavation drop-offs, uneven ground and other obstructions.
9. Before backing, make sure area is clear and use an observer when available.
10. Be aware of stockpile stability when removing material. Do not leave vertical slopes in stockpiles that could collapse on a person on foot.
11. Truck drivers should stay in the cab while the truck is being loaded.
12. Be aware of escape routes in case of emergency.
13. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.

Related SOP'S

General SOPsChapter 10	Trailers and Towed Equipment.....12B-29
Dump Truck12A-30	Front End Loader12A-11
Grader.....12A-7	Crawler Tractor.....12A-23
Backhoe and Loader12A-22	Crew Cab & Flatbed Truck.....12A-22

Litter Pickup

Hazard Review

Moving Traffic	Overcrowding of Workers	Slip, Trip and Fall
Poisonous Plants/Insects/Snakes		Hidden/Sharp or Broken Objects
Unknown/Unlabeled Substances	Animals	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
6. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
7. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
8. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
9. Allow ample space for each employee to work safely.
10. Place tools in safe position so that sharp points are not exposed.
11. Be aware of hidden obstructions that may have sharp edges and broken glass especially in grassy areas.
12. Properly identify material or object before handling. For unknown possible hazardous materials notify proper authorities.
13. Use caution when handling trash bags containing broken or sharp objects.
14. Place trash bags where they can be easily retrieved and clear of roadway traffic.
15. Use proper lifting techniques when loading trash bags.

Related SOPs

General SOPs	Chapter 10	Crew Cab and Flatbed Truck	12A-29
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Block and Brick Masonry

Hazard Review

Scaffold Tilting	Falling Objects	Boards Breaking
Overload	Slip, Trip and Fall	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Wear personal protective equipment consistent with hazard.
3. Employee on ground needs to keep eyes on scaffolding when walking or working under scaffold.
4. Avoid carelessly setting scaffold legs on soft, unlevel ground.
5. Use mud seal and build scaffolds level.
6. Never set scaffolds so far apart that the boards do not have proper lap on each end.
7. Always use boards that will carry the expected load.
8. Avoid using undersize boards or knotty boards.
9. Properly stack and locate materials on boards in order to prevent materials from falling.
10. Use proper lifting techniques.
11. Review MSDS for each material used.

Related SOPs

General SOPs	Chapter 10	Hand Tools (Power and Manual)	12B-13
Scaffolding.....	12B-22		

Minor Shoulder Maintenance

Hazard Review

Moving traffic	Moving equipment	Slip, Trip and Fall
Lifting	Temperature Extremes	Dust, Flying Particles
Sun Exposure	Poisonous Plants/Snakes/Insects	Animals

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
7. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
8. Be aware of loose material, excavation drop-offs, tripping hazards, uneven ground and other obstructions.
9. Allow ample space for each employee to work safely.
10. Use proper lifting and handling techniques while shoveling material.
11. Before backing, make sure area is clear and use an observer when available.
12. Watch for flying sand and rock from sweeping operation and adjacent traffic.
13. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.

Related SOPs

General SOPsChapter 10	Broom12A-3
Grader.....12A-7	Force Feed Loader.....12A-10
Front End Loader.....12A-11	Backhoe and Loader12A-22
Crew Cab and Flatbed Truck12A-29	Dump Truck.....12A-30
Hand Tools (Power and Manual)12B-13	Trailers and Towed Equipment.....12B-29

Nondestructive Testing of Pavements

Hazard Review

Moving Traffic	Temperature Extremes	Moving Equipment
Slip, Trip and Fall		

1. Review Safe Working Procedures for applicable equipment and perform pre-operational checks.
2. Determine traffic control needs from the Work Zone Safety Handbook. The use of a shadow vehicle equipped with a crash attenuator is required for high volume roadways.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide for maximum protection for workers getting in and out of the vehicle.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
6. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
7. Before backing, make sure area is clear and use an observer when available.
8. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
9. Be aware of fire extinguisher locations and routinely check to see that they are properly charged.
10. Determine if weather conditions are safe for the performance of the day's work.
11. Stay clear of weight package when FWD is in operation.

Related SOPs

General SOPs	Chapter 10	Trailers and Towed Equipment.....	12B-29
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Overhead and Cantilever Sign Maintenance

Hazard Review

Moving Traffic	Slip, Trip and Fall	Electric Shock
Lifting	Confined Space	Hand-Operated Power Equipment

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, aerial devices, etc.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
8. Locate all utilities in and near work site prior to excavating.
9. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
10. Routine maintenance should not be performed during peak traffic periods.

Related SOPs

General SOPs	Chapter 10	Aerial Device Truck	12A-26
Hand Tools (Power and Manual)	12B-13		

Pavement Marking Removal

Hazard Review

Moving Traffic	Slip, Trip and Fall	Sun Exposure
Blowing Dust and Fines	Lifting	Hand-Operated Power Equipment

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
6. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Wear mask and goggles or safety glasses during operation.

Related SOPs

General SOPsChapter 10	Crew Cab and Flatbed Truck12A-29
Traffic Paint Line Remover.....12B-16	Trailers and Towed Equipment.....12B-29

Pile Driving

Hazard Review

Overhead Loads	Confined Spaces	Swinging Objects
Climbing	Lifting	Rigging
Moving Equipment	Utilities	Crushing

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment. Hearing protection is often needed.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely.
11. Locate all utilities in and near work site prior to commencing work.
12. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
13. Keep walk spaces and work areas free from loose materials or tools.
14. Review MSDS for all hazardous materials being used or expected to be encountered.
15. Dispose of salvage materials properly, use gloves and long sleeves when handling treated timber, sheet piles or steel piles.
16. Be aware of pinch points and crushing hazards.
17. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
18. Employees should wash hands before eating, drinking or smoking.
19. Only one person shall be designated to communicate with the crane operator and shall review signals prior to commencing work.

Related SOPs

General SOPs	Chapter 10	Rigging.....	11E-8
Crane/Dragline.....	12A-4	Trailers and Towed Equipment.....	12B-29

Pipe Installation

Hazard Review

Trench Collapse	Suspended Loads	Moving Traffic
Moving Equipment	Crushing Injuries	Lifting
Slip, Trip and Fall	Poisonous Plants/Snakes/Insects	Confined Space
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Evaluate site and follow “Excavating, Trenching and Shoring” Safe Operating Procedures.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
7. Avoid walking and working under suspended loads. Wear hard hat when working around backhoes, cranes, excavators, etc.
8. Proper lifting techniques shall be used. Get help or use pipe hook, pry bar or other equipment as necessary.
9. Be aware of escape routes in case of emergency. It is a good practice to work facing oncoming traffic while on foot.
10. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
11. Allow ample space for each employee to work safely.
12. Be aware of crushing hazards and pinch points when handling and jointing pipe.
13. Locate all utilities in and near work site prior to commencing work. Call ULOCO.
14. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
15. Rubber boots may be needed in wet ditches.
16. Do not use any equipment that is unsafe.

Related SOPs

General SOPs	Chapter 10	Excavating, Trenching and Shoring.....	11E-2
Explosives.....	11E-3	Excavator, Hydraulic	12A-5
Backhoe and Loader	12A-22	Crew Cab and Flatbed Truck	12A-29
Dump Truck	12A-30	Hand-Operated Compactor.....	12B-5
Trailers and Towed Equipment	12B-29		

Pipe/Culvert Maintenance

Hazard Review

Trench Collapse	Moving Equipment	Overhead Loads
Utilities	Lifting	Confined Space
Moving Traffic	Slip, Trip and Fall	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: Provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment. Rubber boots are recommended when working in wet ditches.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely.
11. Locate all utilities in and near work site prior to excavating. Call ULOCO.
12. Watch for poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
13. Keep walk spaces and work areas free of loose materials or tools.
14. Review MSDSs for all hazardous materials being used or expected to encounter.
15. Be aware of pinch points and crushing hazards.
16. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures. In hot weather, drink plenty of fluids.
17. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPsChapter 10	Excavating, Trenching and Shoring.....11E-2
Explosives.....11E-3	Rigging.....11E-8
Crane/Dragline.....12A-4	Backhoe and Loader12A-22
Crew Cab and Flatbed Truck12A-29	Hand-Operated Compactor.....12B-5
Hand Tools (Power and Manual)12B-13	Trailers and Towed Equipment.....12B-29

Placing Concrete

Hazard Review

Hazardous Material	Parking	Moving Traffic
Overhead Loads	Lifting	Scaffolding
Trench Collapse	Confined Space	Slip, Trip and Fall

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
9. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely.
11. Locate all utilities in and near work site prior to commencing work.
12. Be aware of poisonous plants, insects and snakes. Wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
13. Be alert to protruding nails, spikes or reinforcing bars in decks and rails.
14. Keep walk spaces and work areas free of loose materials or tools.
15. Review MSDSs for all hazardous materials being used or expected to encounter.
16. Dispose of salvage materials properly; use gloves and long-sleeved shirts when handling treated timbers.
17. Be aware of pinch points and crushing hazards.
18. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
19. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPs	Chapter 10	Rigging.....	11E-8
Concrete Pump.....	12B-7	Hand Tools (Power and Manual).....	12B-13
Scaffolding.....	12B-22		

Planting and Plant Bed Maintenance

Hazard Review

Moving Traffic	Moving Equipment	Temperature Extremes
Poisonous Plants/Insects/Snakes	Lifting	Flying Particles
Overcrowding of Workers	Uneven Ground	Restricted-Use Chemicals
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
8. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
9. Allow ample space for each employee to work safely.
10. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
11. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
12. Watch for flying sand, fertilizer and mulch during seeding and mulching operation. Be aware of wind direction and try to work upwind. Eye protection should be worn.
13. When operating trucks and other equipment off of the roadway, be aware that there may be hidden objects in the grass and unstable terrain.
14. Read product labels, MSDS and pest control recommendation before handling pesticides. The documents are required to be at application site.
15. Before backing, make sure area is clear and use an observer when available.

Related SOPs

General SOPs	Chapter 10	Hazardous Waste Handling and Storage	11E-4
Wheel Tractor	12A-25	Crew Cab and Flatbed Truck	12A-29
Fumigation (Gassing) Rig.....	12B-11	Tractor Attachments	12B-28
Trailers and Towed Equipment	12B-29		

Precast Box Culvert Installation

Hazard Review

Trench Collapse	Moving Equipment	Overhead Loads
Utilities	Lifting	Confined Space
Moving Traffic	Slip, Trip and Fall	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: Provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely.
11. Locate all utilities in and near work site prior to commencing work.
12. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
13. Keep walk spaces and work areas free from loose materials or tools.
14. Review MSDS for all hazardous materials being used or expected to be encountered.
15. Dispose of salvage materials properly; use gloves and long sleeve shirts when handling treated timbers.
16. Be aware of pinch points and crushing hazards.
17. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
18. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPs	Chapter 10	Excavating, Trenching and Shoring.....	11E-2
Explosives.....	11E-3	Rigging.....	11E-8
Crane/Dragline.....	12A-4	Crew Cab and Flatbed Truck.....	12A-29
Hand-Operated Compactor.....	12B-5	Hand Tools (Power and Manual).....	12B-13
Trailers and Towed Equipment.....	12B-29		

Raised Pavement Marker Installation/Maintenance

Hazard Review

Moving Traffic	Heat and Cold Stress	Heated Materials
Moving Equipment	Sun Exposure	Blowing Particles

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Use caution when handling hot/flammable materials. Review MSDS for each material used.
6. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
7. Utilize all components of the installation train when placing or replacing markers.
8. Avoid operation during peak traffic periods.

Related SOPs

General SOPs	Chapter 10	Crew Cab and Flatbed Truck	12A-29
Truck-Mounted Attenuator.....	12B-2	Trailers and Towed Equipment.....	12B-29

Rest Area Maintenance

Hazard Review

Caustic Cleaning Agents	Poisonous Plants/Insects/Snakes	Sharp Edged Tools
Power Tool Operation	Lifting	Slip, Trip and Fall
Hidden/Sharp/Broken Objects	Animals	

1. Wear appropriate personal protective equipment consistent with the hazard.
2. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
3. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate them.
4. Place tools in safe position so that sharp points are not exposed.
5. Be aware that there may be hidden obstructions with sharp edges and broken glass especially in grassy areas.
6. Use caution when handling trash bags containing broken or sharp objects.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Review product labels and MSDS before using any caustic cleaning or sanitizing chemicals.
9. Keep sidewalks and floors free from obstructions and ice and snow during inclement weather. Place appropriate warning signs when mopping or waxing floors.

Related SOPs

General SOPs	Chapter 10	Lawn Mower	12A-9
Wheel Tractor	12A-25	Hand Tools (Power and Manual)	12B-13
Tractor Attachments	12B-28		

Rip Rap Installation/Removal

Hazard Review

Heavy Materials	Uneven and/or Unstable Footing	Overcrowding of Workers
Moving Equipment	Poisonous Snakes/Plants/Insects	Flying Particles
Moving Traffic	Animals	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hand, respiratory and eye protection may be required.
5. Be aware of escape routes in case of emergency. It is a good practice to work facing oncoming traffic while on foot.
6. Use proper lifting technique when moving rip rap. Get help if stones are too heavy.
7. Use gloves and handle carefully to avoid mashing fingers.
8. Watch for tripping hazards and slippery footing.
9. Allow ample space for each employee to work safely.
10. Employees on foot should stay out of the way of operating equipment until the area is clear for hand work.
11. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
12. Watch for flying dust and fine particles when handling rip rap. Be aware of the wind direction and try to work upwind. Use eye protection when needed.
13. Rubber boots may be needed in wet ditches.

Related SOPs

General SOPs	Chapter 10	Excavator, Hydraulic	12A-5
Front End Loader	12A-11	Backhoe and Loader	12A-22
Crew Cab and Flatbed Truck	12A-29	Dump Truck	12A-30
Trailers and Towed Equipment	12B-29		

Roadside Equipment Repair

Hazard Review

Crushing Injuries	Slip, Trip and Fall	Adverse Weather Conditions
Exposure To Sharp Edges of Tools	Flammable Materials	Hazardous Materials/Battery Acid
High Pressure	Hot Materials	Lifting
Moving Traffic	Wheel Rolling	Hoisting and Jacking

1. Use safe driving techniques when pulling off the road, parking off the road and pulling back onto the road.
2. Use proper warning markers appropriate for daylight or darkness when parked to work on vehicles or equipment.
3. Proper lifting techniques should be used. Get help or use equipment if necessary.
4. Always use the proper tools for the job.
5. Always park as far as possible away from traffic.
6. Be certain jacks and hoisting equipment are rated for the loads being lifted.
7. Use proper jacking and hoisting procedures.
8. Take caution to avoid hot surfaces, liquids and materials.
9. Use proper precautions when working with equipment subject to high pressure such as radiators, tires, hydraulic systems and batteries.
10. Use proper safety precautions to avoid explosive, chemical injuries when working with or near batteries. Wear eye protection.
11. Ascertain the stability of equipment being repaired and the service vehicles when stopped on the road or off the road, particularly on uneven terrain.
12. Clean up gasoline, oils or detergents that may present fire or other safety hazards.
13. Ensure that first aid kits and fire extinguishers are readily available and in good condition.
14. Disable starting circuits or procedures systems when working around engines or other equipment moving parts to prevent inadvertent equipment or accessory movement.
15. Wear appropriate personal protective equipment consistent with the hazard.

Related SOPs

General SOPs	Chapter 10	Hydraulic System Repairs.....	11A-10
Maintenance and Repair Shops (General)	11A-21	Mechanic Operations	11A-22
Tire Repair	11A-36	Crew Cab and Flatbed Truck.....	12A-29
Field Mechanic Truck	12A-31		

Roadway Inspection

Hazard Review

Poisonous Plants, Insects and Snakes	Parking	Moving Equipment
Slip, Trip and Fall	Open Excavations	Paving Operations
Moving Traffic	Concrete MSDS/Cautions	Extreme Temperatures
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Check to ensure that signing and traffic control is in accordance with project traffic control plans.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicle and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. When extracting concrete cylinders from molds at Material and Tests labs, use proper eye wear.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment. Stay alert to equipment movement.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions. Newly seeded areas are especially hazardous.
8. Be aware of guidelines for proper trenching and excavation. Do not enter areas inadequately protected from cave-ins.
9. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
10. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
11. Use caution when handling hot/flammable materials. Review MSDS for each material used.
12. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperature.
13. Inspect contractor's equipment periodically for required back up alarms.
14. When performing inspection duties, note the location and proximity of construction equipment. Avoid working in the blind spots of construction equipment. If inspections must be performed in equipment blind spots, advise the equipment operator of your presence and stay alert to your surroundings.

Related SOPs

General SOPs	Chapter 10	Asphalt Field Laboratory	11B-2
Blast Monitoring	11B-6	Density Inspection	11B-17
Excavating, Trenching and Shoring	11E-2		

Roadway Lighting Installation/Maintenance

Hazard Review

Moving Traffic	Slip, Trip and Fall	Lifting
Temperature Extremes	Electrical Power	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, aerial devices, etc.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstruction.
10. Locate all utilities in and near work site prior to excavating.
11. Take extra precautions to prevent heat and cold stress when working in extremely hot and cold temperatures.
12. Use established safety procedures when working around electrical lines and connections.

Related SOPs

General SOPsChapter 10	Aerial Device Truck12A-26
Hand Tools (Power and Manual)12B-13	Trailers and Towed Equipment.....12B-29

Sampling and Inspection at Producer's Facility

Hazard Review

Lifting	Crushing Injuries	Burns
Moving Equipment	Flying Particles	Slip, Trip and Fall
Noise	Fumes	Cuts

1. Use proper lifting techniques.
2. Wear appropriate personal protective equipment. Wear steel-toed shoes at all times. Wear hard hats, safety vests, safety glasses, hearing protection and breathing protection as required by Personal Protective Equipment policy or producer's policy, whichever is more stringent.
3. Review and follow producer's safety procedures.
4. Be aware of moving equipment and moving parts on machinery. Be alert at all times.
5. Be aware of uneven and/or slippery surfaces.
6. Operate all hand and power tools properly. Be sure all guards and shields are in place.
7. Be aware of sharp edges on materials.
8. Be aware of hot surfaces associated with welding.
9. Avoid work under or adjacent to suspended loads.

Related SOPs

General SOPs	Chapter 10	Oxy-Acetylene Cutting/Welding.....	11A-27
Arc Welding.....	11A-40	Borrow Pit, Waste Pit and Stockpiling Operations	11B-7
Roadway Inspection	11B-63	Hand Tools (Power and Manual)	12B-13

Seeding, Mulching and Top Dressing

Hazard Review

Moving Traffic	Moving Equipment	Poisonous Plants/Insects/Snakes
Lifting	Hot Flammable Materials	Dust
Flying Particles	Uneven Ground	Overcrowding of Workers
Animals		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles and equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with operator before approaching equipment.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of escape routes in case of emergency. It is a good practice to face oncoming traffic while on foot.
8. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
9. Allow ample space for each employee to work safely.
10. Use caution when handling hot/flammable materials. Review MSDS for each material used.
11. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
12. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
13. Watch for flying sand, fertilizer and mulch during seeding and mulching operation. Be aware of wind direction and try to work upwind. Eye protection should be worn.
14. Keep fire extinguishers available at all times when using a fired kettle.
15. When operating trucks and other equipment off of the roadway, be aware that there may be hidden objects in the grass and unstable terrain.
16. Before backing make sure area is clear and use an observer when available.

Related SOPs

General SOPs	Chapter 10	Asphalt Distributor	12A-1
Hydro Seeder.....	12A-8	Wheel Tractor	12A-25
Crew Cab and Flatbed Truck	12A-29	Air Compressor.....	12B-1
Hand Tools (Power and Manual)	12B-13	Mulch Blower	12B-17
Trailers and Towed Equipment	12B-29		

Sign Installation/Maintenance

Including Delineators

Hazard Review

Moving Traffic	Slip, Trip and Fall	Lifting
Temperature Extremes	Sun Exposure	Power Equipment

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks,
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work areas; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
7. Where evidence of underground utilities exists at the proposed sign location, have utilities located prior to installing post.
8. Wear gloves and goggles when driving posts.
9. Use sledge hammer for driving only when posts are too short to drive with post driver.

Related SOPs

General SOPs	Chapter 10	Sign Erector Truck.....	12A-35
Hand Tools (Power and Manual)	12B-13		

Special Markings Installation

Hazard Review

Moving Traffic	Slip, Trip and Fall	Working With Heated Equipment
Paint Fumes	Temperature Extremes	Sun Exposure
High Air Pressure	Lifting	Blowing Fines (Glass beads and dust)

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard.
5. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
6. Use caution when handling hot/flammable materials. Review MSDSs for each material used.
7. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
8. Beware of ticks during summer months.
9. Wear gloves when handling metal stencils.
10. Wear protective clothing when handling hot thermoplastic materials (long sleeves).

Related SOPs

General SOPsChapter 10	Centerline Paint Machine 12A-12
Crew Cab and Flatbed Truck 12A-29	Air Compressor..... 12B-1
Hand Tools (Power and Manual) 12B-13	Traffic Paint Line Remover..... 12B-16

Steel Plank Floor Maintenance

Hazard Review

Moving Traffic	Welding/Cutting	Parking
Utilities	Lifting	Jacking
Slip, Trip and Fall	Scaffolding	Noise

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely.
11. Locate all utilities in and near work site prior to commencing work.
12. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
13. Be alert to protruding nails or spikes in decks and rails.
14. Keep walk spaces and work areas free of loose materials or tools.
15. Review MSDSs for all hazardous materials being used or expected to encounter.
16. Dispose of salvage materials properly; use gloves and long-sleeved shirts when handling creosote timbers.
17. Be aware of pinch points and crushing hazards.
18. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
19. Employees should wash hands before eating, drinking or smoking.
20. Observe safe operating procedures for welding and cutting.
21. Be aware that repetitive bending while using stud gun fastener can cause back and knee strain.

Related SOPs

General SOPs	Chapter 10	Oxy-Acetylene Cutting/Welding	11A-27
Shop/Vessel Pipefitting.....	11A-29	Rigging.....	11E-8
Crew Cab and Flatbed Truck	12A-29	Hand Tools (Power and Manual)	12B-13
Scaffolding.....	12B-22		

Structural Steel Cleaning

Hazard Review

Hazardous Material	Moving Traffic	Scaffolding
Utilities	Noise	Slip, Trip and Fall

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of loose materials, tripping hazards and other obstructions.
8. Allow ample space for each employee to work safely.
9. Locate all utilities in and near work site prior to commencing work
10. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
11. Keep walk spaces and work areas free of loose materials or tools.
12. Review MSDSs for all hazardous materials being used or expected to encounter.
13. If working in a confined space, provide forced ventilation or use other measures to ensure good air quality.
14. If red lead is encountered while sandblasting, stop work immediately and consult Supervisor.
15. If red lead is encountered while power tooling, approved respiratory equipment and protective clothing shall be issued before work commences. All red lead shall be contained at the job site.
15. Do not clean hands with pressurized air.
16. Take extra precautions to prevent heat or cold stress when working in extremely hot or cold temperatures.
17. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPs	Chapter 10	Shop/Vessel Pipefitting	11A-29
Sandblasting.....	11A-32	Crew Cab and Flatbed Truck.....	12A-29
Hand Tools (Power and Manual)	12B-13	Scaffolding.....	12B-22

Structural Steel Fabrication

Hazard Review

Toxic Chemicals	Lifting	Moving Traffic
Scaffolding	Utilities	Noise
Slip, Trip and Fall		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Proper lifting techniques shall be used. Get help or use equipment if necessary.
6. Be aware of loose materials, tripping hazards and other obstructions.
7. Allow ample space for each employee to work safely.
8. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
9. Keep walk spaces and work areas free of loose materials or tools.
10. Employees should be aware of the hazardous fumes created by welding and cutting.
11. If working in a confined space, provide forced ventilation or other means to provide good air quality.
12. Review safe operating procedures for welding and cutting.
13. Avoid handling steel with bare hands. Steel could be hot from welding or cutting and steel slivers from drilling or other power tool cutting could puncture the skin.
14. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPsChapter 10	Forming and Shearing Metal Punching11A-25
Oxy-Acetylene Cutting/Welding11A-27	Structural Steel Painting.....11B-72
Hand Tools (Power and Manual)12B-13	Scaffolding.....12B-22

Structural Steel Painting

Hazard Review

Toxic Chemicals	Lifting	Moving Traffic
Scaffolding	Utilities	Noise
Slip, Trip and Fall		

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Proper lifting techniques shall be used. Get help or use equipment if necessary.
7. Be aware of loose materials, tripping hazards and other obstructions.
8. Allow ample space for each employee to work safely.
9. Locate all utilities in and near work site prior to commencing work
10. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
11. Be alert to protruding nails or spikes in decks and rails.
12. Keep walk spaces and work areas free of loose materials or tools.
13. Review MSDSs for all hazardous materials being used or expected to encounter.
14. If working in a confined space, provide forced ventilation or use other measures to ensure good air quality.
15. Do not clean hands with pressurized air.
16. Take extra precautions to prevent heat and cold stress when working around extremely hot or cold temperatures.
17. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPsChapter 10	Hoisting/Jacking11A-9
Structural Steel Cleaning.....11B-70	Structural Steel Fabrication.....11B-71
Air Compressor.....12B-1	Hand Tools (Power and Manual).....12B-13
Scaffolding.....12B-22	

Timber Bridge Floor Maintenance

Hazard Review

Moving Traffic	Hazardous Materials	Parking
Utilities	Lifting	Jacking
Slip, Trip and Fall	Scaffolding	Noise

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely.
11. Locate all utilities in and near work site prior to excavating.
12. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
13. Be alert to protruding nails or spikes in decks and rails.
14. Keep walk spaces and work areas free of loose materials or tools.
15. Review MSDSs for all hazardous materials being used or expected to encounter.
16. Dispose of salvage materials properly, use gloves and long-sleeved shirts when handling treated timbers.
17. Be aware of pinch points and crushing hazards.
18. Take extra precautions to prevent heat and cold stress when working around hot or cold temperatures.
19. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
Rigging.....	11E-8	Crew Cab and Flatbed Truck	12A-29
Air Compressor.....	12B-1	Hand Tools (Power and Manual)	12B-13
Scaffolding.....	12B-22		

Timber Bridge Super/Sub Structure Maintenance

Hazard Review

Moving Traffic	Hazardous Materials	Parking
Utilities	Lifting	Jacking
Slip, Trip and Fall	Scaffolding	Noise

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Avoid walking and working under suspended loads.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary.
8. Be aware of escape routes in case of emergency.
9. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions.
10. Allow ample space for each employee to work safely.
11. Locate all utilities in and near work site prior to commencing work.
12. Be aware of poisonous plants, insects and snakes. It is a good practice to wear long sleeve shirts, gloves and high top boots when hazards can not be avoided.
13. Be alert to protruding nails or spikes in decks and rails.
14. Keep walk spaces and work areas free of loose materials or tools.
15. Review MSDSs for all hazardous materials being used or expected to encounter.
16. Dispose of salvage materials properly; use gloves and wear long-sleeved shirt when handling treated timbers.
17. Be aware of pinch points and crushing hazards.
18. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
19. Employees should wash hands before eating, drinking or smoking.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
Rigging.....	11E-8	Crew Cab and Flatbed Truck.....	12A-29
Hand Tools (Power and Manual)	12B-13	Scaffolding.....	12B-22

Towing Disabled Equipment

Hazard Review

Moving Traffic	Moving Equipment	Weather
Crushing Injuries	Overhead Objects	Fire
Hooking and Unhooking	Suspended Loads	Roll Over
Backing	Slip, Trip and Fall	Utilities
Kickout	Uneven Ground	Towing Attachment

1. Review safe operating procedures for applicable equipment and perform pre-operational checks. Make sure all emergency and warning lighting is working.
2. Wear personal protective equipment consistent with the hazard.
3. If available, consult operator’s manual for proper towing equipment, methods and procedures; otherwise, seek assistance from trained, qualified personnel.
4. No personnel shall be allowed to ride in the towed vehicle except when necessary for steering and/or braking.
5. When towing disabled equipment during winter storms or other inclement weather, adjust operating speed with the changing conditions.
6. Operators and passengers in the towing vehicle shall wear seat belts and shoulder harness as provided.
7. Stay clear of all moving parts, belts, pulleys, machinery, winches, cables, chains, etc.
8. Use proper backing techniques.
9. Be aware of backlash from broken cables and chains.
10. Be certain the towing apparatus is securely hooked to the frame, chassis or member.
11. Use safety chains.
12. Be aware of escape routes.
13. Avoid overloading and sudden jerks.

Related SOPs

General SOPs	Chapter 10	Hoisting/Jacking	11A-9
Mechanic Operations.....	11A-22	Rigging.....	11E-8
Trailers and Towed Equipment	12B-29		

Traffic Signal Installation/Maintenance

Hazard Review

Moving Traffic	Slip, Trip and Fall	Lifting Heavy Objects
Confined Space	Sun Exposure	Hand-Operated Power Equipment
High Voltage Power Lines		

1. Use established safety procedures when working around electrical lines and connections.
2. Perform no modification to lift equipment which may diminish hazard protection.
3. Wear safety belt when in elevated position in bucket truck.
4. Chock wheels and engage braking system before operating aerial lift device.
5. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
6. Determine the traffic control needs from the Work Zone Safety Handbook.
7. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
8. Wear appropriate personal protective equipment consistent with the hazard.
9. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
10. Avoid walking and working under suspended loads. Hard hats are required.

Related SOPs

General SOPsChapter 10	Aerial Device Truck12A-26
Concrete Saw12B-8	Hand Tools (Power and Manual)12B-13
Trailers and Towed Equipment12B-29	Trenching Machine.....12B-30

Traffic Survey Equipment/Maintenance

Hazard Review

Moving Traffic	Slip, Trip and Fall	Confined Space
Sun Exposure	Poisonous Plants, Snakes and Insects	Flying Particles
Lifting	Temperature Extremes	

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Determine the traffic control needs from the Work Zone Safety Handbook.
3. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicle.
4. Wear appropriate personal protective equipment consistent with the hazard. Hard hats, safety shoes, safety glasses and vests are standard required equipment.
5. Proper lifting techniques shall be used, get help or use equipment if necessary.
6. Be aware of escape routes in case of emergency. Face oncoming traffic.
7. Be aware of poisonous plants, snakes and insects. It is a good practice to wear long sleeve shirts, gloves and high top boots when the hazard cannot be avoided.
8. Take extra precautions to prevent heat and cold stress when working hot or cold temperatures.
9. Employees should wash hands before eating, drinking, or smoking.
10. Be aware of flying sand, dust or other debris when blowing out cracks with compressed air. Eye protection must be worn. Be aware of wind direction and try to work upwind.

Related SOPs

General SOPsChapter 10	Ladders.....12B-15
Hand Tools(Power and Manual)12B-13	Hand Removal of Vegetation11B-40

Tree Felling

Hazard Review

Utility Lines	Wind	Dead Limbs/Hollow Spots
Poisonous Plants, Insects & Snakes		Slip, Trip and Fall
Animals		

1. Each work location where tree felling is to be done shall be under the direction of a person trained and qualified in tree felling.
2. Wear appropriate personal protective equipment consistent with the hazard. Hard hat, eye and face protection, hearing protection and safety shoes are required when using a chain saw. Chaps are also advisable at times.
3. Be aware of poisonous plants, insects, snakes, animals, and animal waste products and carcasses. It is a good practice to wear long sleeve shirts, gloves and high-top boots when hazards cannot be avoided.
4. Before felling any tree the following should be considered:
 - Shape of the tree
 - Wind force and direction
 - Location of overhead utilities
 - Any other things that may cause trouble when the tree falls
 - Extra stress from ice, vines, etc.
 - Lean of the tree
 - Decayed, hollow or other weak spots
 - Location of other workers and equipment
5. The work area should be cleared and an escape route planned before any cutting is started.
6. Each employee involved in the felling shall be instructed exactly what to do. All workers not involved in the operation should keep clear of the work area.
7. A notch or backcut should be used in felling trees over ten inches measured at belt height. No tree shall be felled by ripping or slicing cuts.
8. The depth or penetration of the notch should be about one-third the diameter of the tree.
9. The opening or height of the notch should be about 2 1/2 inches for each foot of the tree's diameter.
10. The backout shall be made higher than the point of the notch to prevent kickback.
11. An audible warning must be given when the tree is ready to fall. Feller must shut off saw before retreat.
12. If there is danger from the tree falling in the wrong direction, wedges, block and tackles, rope or wire cable shall be used. Wire cable should not be used when there are electrical hazards present. All limbs shall be removed from trees to a height and width sufficient to allow the tree to fall clear of any wires and other objects in the vicinity.
13. Extra caution should be used when trees are rotten, split, hollow or frozen because they may fall in an unexpected direction even though the cut is made on the proper side.
14. Keep clear of the butt of the tree when it starts to fall.
15. Multiple cutting on the same felled tree should be avoided. Be aware of others working in the area. Limbs often roll/move during cutting and removal.
16. Worker must not approach a feller closer than twice the height of the tree until eye contact with the feller has been established.

Related SOPs

General SOPs	Chapter 10	Hand Removal of Vegetation.....	11B-40
Crew Cab and Flatbed Truck	12A-29	Brush Chipper.....	12B-3
Chain Saw and All-Purpose Cut-Off Saw	12B-4		

Tug Operations

Hazard Review

Noise	Drowning/Hypothermia	Lifting
Hot Surfaces	Crushing Injuries	Adverse Weather
Fire	Moving Machinery Parts	Unsecured Objects
Towline Stress	Slip, Trip and Fall	Confined Spaces
Electric Shock		

1. Wear appropriate personal protective equipment consistent with the hazard. Eye protection shall be worn when sanding, scraping or working on batteries. Hearing protection shall be worn in designated areas. Personal Flotation Devices shall be worn when working in areas where slips, trips, or falls would likely result in falling overboard. Gloves are required when handling wire rope.
2. Be aware of loose objects, slippery decks, tripping hazards, uneven deck coamings, "headbangers," and other obstructions. Always use handrails when ascending or descending ladders.
3. Proper lifting techniques shall be used. Get help or use lifting equipment if necessary.
4. Always stand on rubber padding when working around distribution panels.
5. Confined spaces must be well-ventilated prior to entry. Never enter a confined space without a standby observer.
6. Never leave doors ajar. Doors should be securely closed or hooked in the opened position. Be mindful of stress on doors due to either created vacuum or high wind.
7. Ensure shore connections are de-energized before connecting shore power. Before using portable power tools, inspect for frayed or cut wiring, loose connections and proper grounding.
8. Ensure towing bridles are properly secured. Never stand in the bight of a line. Stand well clear of tow lines which are under strain.
9. If a fire fighting or rescue operation is required, remember the limitations of your training and take no unnecessary risks.
10. Be alert for falling or shifting objects during heavy weather conditions.
11. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
12. Take extra precautions to prevent heat and cold stress.

Related SOPs

General SOPs	Chapter 10	Dredging (Construction Crew)	11B-19
Dredging (Operations).....	11B-20	Ferry Engineering.....	11B-29
Ferry Operations.....	11B-31	Confined Space Entry	11E-1
Lockout/Tagout.....	11E-7	Hand Tools (Power and Manual).....	12B-13

Underwater Inspection and Maintenance

Hazard Review

Moving Traffic	Hazardous Materials	Parking
Utilities	Lifting	Communication
Sharp Objects	Poisonous Plants and Animals	Underwater Obstructions

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks.
2. Review OSHA and State Diving Operation Safe Practice Manual.
3. Determine the traffic control needs from the Work Zone Safety Handbook.
4. Park in areas that: provide safe entrance/exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; and provide maximum protection for workers getting in and out of the vehicles.
5. Standard diving personal protective equipment is required as per OSHA. Use additional equipment as required by each activity.
6. Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
7. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
8. Proper lifting techniques shall be used. Get help or use equipment if necessary.
9. Be aware of escape routes in case of emergency.
10. Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions.
11. Allow ample space for each employee to work safely.
12. Locate all utilities in and near work site prior to commencing work.
13. Be aware of poisonous plants, insects and snakes. Watch for alligators, sharks and other marine life.
14. Watch for protruding reinforcing steel, nails, rusted steel members, submerged drift, cut off piles, old false work and other obstructions. Keep walk spaces and work areas free of loose materials or tools.
15. Review MSDSs for all hazardous materials being used or expected to encounter.
16. Be aware of pinch points and crushing hazards.
17. Take extra precautions to prevent heat or cold stress when working in extremely hot or cold temperatures.
18. Be aware of water conditions that require additional precautions such as high water velocity, pollution, low visibility, boat traffic and fishing lines.

Related SOPs

General SOPsChapter 10	Oxy-Acetylene Cutting/Welding11A-27
High Pressure Hoses.....11E-5	Rigging.....11E-8
Work Boat12A-37	Concrete Pump.....12B-7
Hand Tools (Power and Manual)12B-13	Power Washer.....12B-20
Underwater Air Lift.....12B-31	

Behind the Wheel Training of School Bus Drivers

Hazard Review

Slip, Trip and Fall

Inexperienced Drivers

Hot Surfaces

Fire

1. Perform pre-operational checks on equipment making sure engine is off before beginning inspection.
2. Use proper lifting techniques when opening hood of vehicle.
3. Crouch with one knee down rather than bend to check under bus.
4. Observe trainee closely and constantly monitor traffic around the bus. Be alert for inattentive drivers.
5. Remain in area where the traffic complexity is within the ability of the driver. Be sure to consider his experience and confidence, moving to more demanding or dangerous area only when driver is fully prepared.
6. Prior to testing, give clear preliminary instructions. Stand out of the direct line of the bus. Establish eye contact with the driver before approaching the vehicle.
7. Use handrail.
8. Sit at left edge of seat at angle to driver with both feet on floor.
9. When parking, reduce brake air pressure to lockup point.
10. Remove key from unattended vehicle.
11. All personnel to vacate bus when refueling.
12. Do not over fill fuel tank.

Related SOPs

General SOPsChapter 10

Commercial Vehicles Examination and Road Test

Hazard Review

Moving Traffic	Inexperienced Driver	Communications Barrier
Slip, Trip and Fall		

1. Complete proper pre-operational checks of equipment verifying that parking brake is set and gear shift is in park position. Always conduct inspection in a safe, low traffic area.
2. Client should be able to comprehend essential basic instructions or commands of the Examiner.
3. Be aware of loose or slippery handles, steps and ladders when boarding vehicle. When entering and exiting large vehicles, maintain three points of contact and always face the vehicle.
4. Never jump from a large vehicle.
5. Examiner should maintain a calm demeanor and issue simple, crisp instructions throughout the course of road test.
6. During course of road test, if the client is determined to be inept/unsafe, pull to side of road and discontinue test.

Related SOPs

General SOPChapter 10

Law Enforcement Officer I

Hazard Review

Struck by Vehicle	Gunshot Wound	Diseases or Blood Contamination
Hazardous Materials	Overhead loads	Assault
Vicious Animals	Fire and Explosion	

1. Be observant, check traffic and location before stopping vehicle.
2. Where hazardous materials are involved, policies regarding radioactive materials and nuclear devices, toxic chemical spills and/or rupture of natural gas pipelines should be strictly adhered to.
3. Use extreme caution when walking in salvage yards and use safety stand when working under vehicle.
4. Beware of poisonous plants, snakes and insects, as well as vicious animals.
5. Follow proper high risk arrest procedures.

Related SOPs

General SOPsChapter 10

Motor Carrier

Hazard Review

Improper Location	Traffic Accidents	Assault
Struck by Vehicle	Hazardous Cargo	Fall from Vehicle

1. Select paved surface location in light traffic location when possible. Select solid ground area out of traffic flow.
2. Be observant for sudden stops; observe all approaching vehicles.
3. Be observant of driver's behavior and body language.
4. Apply law enforcement training skills.
5. Wear personal protective equipment consistent with the hazard. Safety glasses and hard hats are recommended. Bulletproof vests and breathing apparatus should be used if provided. Wear reflective vests and use traffic cones when warranted.
6. Check for a leak in cargo before going under a vehicle. Check hazardous material class in manual for proper shipping name, use of proper law enforcement interview techniques.
7. Be aware of hand and foot placement and check that load is secure before climbing onto load. Use proper mounting and dismounting techniques.
8. Follow proper high risk arrest procedures.
9. Place vehicle in low gear, shut off engine, remove key and chock wheels.

Related SOPs

General SOPsChapter 10

Non-commercial Vehicles Examination and Road Test

Hazard Review

Moving Traffic	Inexperienced Driver	Communications Barrier
Heavily-Tinted Windows		

1. Complete proper pre-operational checks of equipment verifying that parking brake is set and gear shift is in park position. Always conduct inspection in a safe, low traffic area.
2. When Examiner identifies obvious lack of experience in operation procedures, a learner's permit should be issued in lieu of conducting road test.
3. Always make sure client can comprehend essential basic instructions or commands of the Examiner.
4. Test should not be given in vehicle with glass that does not meet state safety standards.
5. Observe client closely and constantly monitor traffic conditions. Be alert for inattentive drivers.
6. Examiner should maintain a calm demeanor and issue simple, crisp instructions throughout the course of road test.
7. During course of road test, if the client is determined to be inept/unsafe, pull to side of road and discontinue test.
8. Position seat headrest and acquire a protective seating position prior to road test.

Related SOPs

General SOPsChapter 10

Portable Scales/Weighing Trucks

Hazard Review

Lifting	Crushing Injuries	Moving Traffic
Slip, Trip and Fall	Flying Particles	Assault
Diseases or Blood Contamination	Gunshot Wound	Hazardous Material
Fall from Vehicle		

1. Observe work area; consider alternate location if warranted.
2. Be aware of escape routes in case of emergency. Face oncoming traffic when possible.
3. Wear personal protective equipment consistent with the hazard. Reflective vests, safety glasses and protective footwear are recommended.
4. Use proper lifting techniques when handling scales.
5. Use a second officer, when available, to observe traffic.
6. Be aware of loose material, tripping hazards and uneven ground.
7. Stand clear as truck pulls onto scales.
8. Establish safety lane beside the vehicle to be inspected with cruiser. Use safety cone when warranted.
9. Observe condition of tires prior to pulling truck onto scale.

Related SOPs

General SOPsChapter 10

Process Officer

Hazard Review

Gunshot Wound	Cuts	Assault
Struck by Vehicle	Vicious Animals	

1. Be aware of moving traffic. Keep alert for suspicious activities in the areas of vehicle, house and yard.
2. When removing tag, continuously look for dogs or other aggressions.
3. Observe surroundings for secure footing.
4. Be observant of behavior and body language.
5. Follow high-risk arrest procedures when necessary.

Related SOPs

General SOPsChapter 10

Training for Firearms

Hazard Review

Gunshot Wound	Poisonous Plants, Snakes and Insects	Hearing Loss
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1. Unload weapon in a safe area, holster weapon and strap in.
2. Read all range rules and follow Range Officer's Command.
3. Open cylinder or chamber and inspect to verify safe weapon.
4. Face downrange when weapon is drawn and hold weapon barrel in a downrange position.
5. Keep weapon pointed downrange with finger off trigger until ready to fire.
6. Load weapon in designated area before leaving range.
7. Inspect range for rocks, glass, snakes, insects, etc.
8. Maintain radio communication capability and adequate first aid equipment on site at all times.

Related SOPs

General SOPsChapter 10

Field Emergency Response

Hazard Review

Snow/Ice	Utility Lines	Flooding
Moving Traffic	Hazardous Materials	Unknown/Unlabeled Substances
Moving Equipment	High Winds	Rock/Earth Slides
Nighttime Response	Fog/Smoke	Nuclear Plant Disasters

1. Review Safe Operating Procedures for applicable equipment and perform pre-operational checks. Make sure all emergency and warning lighting is working.
2. Plan for adequate supervision at the worksite.
3. Determine traffic control needs from the Work Zone Safety Handbook.
4. Park in areas that: provide safe entrance and exit of the work area; do not create potential conflicts with other vehicles/equipment operating in the work area; provide maximum protection for workers getting in and out of the vehicles.
5. Wear personal protective equipment consistent with the hazard.
6. Employees on foot must use extreme caution to stay clear of operating equipment. Always establish eye contact with the operator before approaching equipment.
7. Be aware of escape routes in case of emergencies. It is a good practice to work facing on-coming traffic when on foot.
8. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
9. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold conditions.
10. When operating trucks and other equipment off the roadway, be aware of hidden objects in grass or unstable terrain.
11. Be observant of utility lines when cutting or removing trees and limbs. Look for and stay clear of downed power lines when clearing debris. Contact appropriate utility companies to coordinate work.
12. For nighttime response, adequate lighting should be provided.
13. When possible, at least two employees should be sent to respond to any emergency situation.
14. Approach flooding condition with caution. Do not attempt to drive through swift or rising flood waters. Install appropriate advance warning/traffic control devices.
15. Approach accident scenes with caution. Do not send personnel or equipment into an area with explosive, flammable, or unknown substances until it is safe to do so. Drivers, passengers, placards, decals, shipping labels, Bills of Laden and the Emergency Response Guidebook might be sources of determining the unknown substances. Do not rely on rumors, rather BE SURE. Take measures to restore orderly traffic flow. Coordinate efforts with police, fire and emergency response officials.
16. When operating vehicles/equipment during winter storms or other inclement weather, adjust operating speed with the changing conditions. Follow Safe Operating Procedures for trucks, material spreaders and other snow/ice removal equipment.
17. For nuclear power plant disasters, refer to the appropriate nuclear plant Emergency Response Plan. There may be requirements to erect evacuation routes, shelter, signing, etc.

SAFE OPERATING PROCEDURES

18. Be prepared to erect road closures and detour route signing to prevent traffic from entering the work site or an area obscured by fog/smoke or an area where the roadway is obstructed.
19. Clerk/dispatcher should be familiar with the operation of communication equipment (radio, telephone and computer terminal) and have the ability to receive and send communications accurately and timely.
20. Clerk/dispatcher should know the general locations of all response personnel on duty.
21. All personnel should cease all operations and seek shelter when wind speeds approach 60 MPH and not return until wind abates below 60 MPH.
22. Emergency generators should be in working order to provide power in case of a loss of commercial power. These generators should be periodically operated and maintained to ensure dependability. Personnel should be instructed in the proper use of emergency generators.
23. Temporary measures taken should be upgraded to appropriate standards as soon as practical following the emergency.
24. When working in or near the water, life preservers or other flotation devices should be worn.
25. Emergency response topics should be discussed at Monthly Safety Meetings.

Related SOPs

General SOPs	Chapter 10	Sign Installation/Maintenance	11B-67
Tree Felling	11B-77	Crew Cab and Flatbed Truck	12A-29
Dump Truck	12A-30	Chain Saw and All-Purpose Cut-Off Saw	12B-4
Hand Tools (Power and Manual)	12B-13		

Geotechnical Emergency Procedures

Hazard Review

Contaminated Soils	Landfills	Containment of Spills
Buried Power or Gas Lines		

1. During drilling operations always be aware of the possibility of encountering potentially hazardous materials such as petroleum hydrocarbons, herbicides, pesticides, chemical manufacturing by-products or solid waste materials. In the event that any unknown or questionable materials are encountered, then the drilling operations are to be suspended immediately until further instructions are received. Do not handle any suspected contaminated materials.
2. During drilling operations always be aware of the possibility of striking an unlocated or improperly located gas or power line. In the event that a buried utility line is struck, drilling operations are to be suspended IMMEDIATELY. If the utility line is electric, then keep a safe distance from all metal surfaces connected with the drill rig. If the utility is gas, then the area should be evacuated and secured. Immediate notification of the utility company is MANDATORY.
3. In the event of a gas or oil spill, the proper authorities should be contacted immediately so that contaminant operations can be implemented. The type of contaminant operation and proper authority will depend on the geographic location of the spill.

Related SOPs

General SOPs	Chapter 11	Geotechnical and Trailer Truck.....	12A-33
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Confined Space Entry

NCDOT operates in many different areas and situations where confined spaces may exist. Typical locations include the holds of ferry vessels, paint truck storage tanks, weigh station scale pits, and sometimes the area between tightly spaced bridge beams. Any area which has a limited opening for entry and exit, or unfavorable natural ventilation, or that is not designed for continuous worker occupancy may be classified as a confined space.

1. All employees shall be trained in the procedures and hazards of the space they are to enter.
2. Employees shall be in good physical condition before entering a confined space.
3. All spaces shall be checked and evaluated by a qualified person before entry.
4. A qualified person shall test for a hazardous atmosphere and complete a confined space entry permit before entry is allowed.
5. No entry will be allowed if any hazardous condition is detected, unless proper protective equipment is used.
6. All persons entering a confined space shall wear the personal protective equipment that is appropriate for the work to be performed.
7. If mechanical ventilation is provided, at least one person shall wear a multi-gas monitoring device. If an alarm sounds, all persons shall immediately evacuate the confined space.
8. Lockout/Tagout procedures shall be followed if the confined space contains mechanically active equipment.
9. The qualified person shall determine if the entry can be made without a qualified attendant or if a standby person is necessary.
10. If an attendant is required, he shall:
 - a. Be trained in rescue from outside techniques
 - b. Not enter confined space under any circumstances
 - c. Be within sight or call of the entrant, and
 - d. Have the means to summon assistance.

Excavating, Trenching and Shoring

Hazard Review

Cave-In	Utilities	Surface Encumbrances
Hazardous Atmosphere	Slip, Trip, Fall	Falling Loads
Water Accumulation		

1. No excavation work shall be started until efforts have been made to determine if underground utilities are located in the area.
2. Any excavation greater than 4 feet deep (not in stable rock) must:
 - a. be provided with an adequate exit (steps or ladder) every 25 feet if employees are expected to enter
 - b. be tested for hazardous gases or oxygen deficiency if such conditions are likely to exist.
3. Any excavation greater than 5 feet deep (not in stable rock) must:
 - a. meet the conditions in item 2, above
 - b. have an adequate means of protection
 - c. be inspected prior to and during the work shift by a “competent person.”
4. The “competent person” must be on site at all times that employees are in the excavation and shall have the authority to stop work if hazardous conditions are detected.
5. Only persons receiving special training may be qualified as “competent persons.”
6. Employees shall not work under loads being handled by excavating or lifting equipment.
7. If employees enter the excavation, both the removed soil and other work material shall be stored at least two feet from the edge.
8. Personal protective equipment such as safety vests, safety shoes, hard hats and safety glasses must be worn as appropriate for the work area.
9. If a trench box, shoring or other protective system will be used, information on the installation, use, placement and removal must be kept on site.
10. If sloping at an angle of 34 degrees (1¹/₂ to 1) is chosen as the protective system, the soil does not have to be classified but the other requirements still apply.

Explosives

1. Only those persons who are trained and certified shall direct, use, transport or conduct blasting operations.
2. Drilling of shot holes, patterns, etc. shall be under the direct supervision of the Explosives Specialist.
3. Blasting machines must remain under the control of the Explosives Specialist and shall not be left unsecured.
4. Unused explosives shall not be left unsecured (out of Explosives Specialist's sight) at any time.
5. All shots shall have some type of shot plan sketch showing shot pattern, number of holes, and amount of explosives per hole including pounds per delay if delays are used. Electrical shots also shall have the wiring patterns and resistances calculated.
6. Electrical shots shall only be done after the available current is computed and then only with an approved blasting machine.
7. Galvanometers shall be used to check circuits during the electrical shots wiring process.
8. Explosives Specialists shall use boosters on all shots with water gels explosives and electric caps.
9. All persons responsible for shot security shall be instructed as to their responsibilities, warning signals and related information.
10. Failure to obey the rules and regulations, as taught in the NCDOT Explosives training, shall result in revocation of an Explosives Specialist's certification.
11. Take care not to operate radio transmission equipment in the vicinity of blast sites which are utilizing electric blasting caps.

Hazardous Waste Handling and Storage

1. Be aware of containers with unknown and/or unlabeled substances. Accidentally mixing waste materials could cause a chemical reaction resulting in fire, explosion, or atmospheric release of toxic vapors. Be alert for heat build-up, vapors, rumbling noise, etc. In such cases, stop work, vacate the area and notify supervisor.
2. Be familiar with the facility plans and other related rules/guides for handling hazardous waste materials. Notify the supervisor if a hazardous substance is spilled. Use proper procedure for clean up, including the use of personal protective equipment.
3. Material handling equipment (forklifts, trucks, etc.) shall be operated in a safe manner, as established in applicable training programs and manufacturers guidelines. The moving of heavy containers could result in punctures. Be alert for leaks, dampness, unusual debris and strange odors caused by airborne contaminants.
4. Posted MSDSs should be read and complied with.
5. Operate oil/water separator only with approval of supervisor.
6. Frequently check pressurized hoses and piping for leaks.
7. Proper lifting techniques shall be used. Get help or use lifting equipment if necessary.
8. Confined spaces must be well ventilated prior to entry and checked by a certified competent person. Never enter a confined space without a standby observer.
9. Be aware of fire extinguishers, alarm and hose locations. Check routinely to make sure they are working properly. Follow good housekeeping practices to reduce the risk of fires.
10. Be aware of loose or slippery materials, tripping hazards and other obstructions. Take appropriate measures to eliminate them.
11. Avoid walking or working under suspended loads. Wear hard hat when working around cranes, forklifts, loaders, etc.
12. Hazardous materials should only be handled by properly trained personnel.
13. Be familiar with local emergency numbers.
14. The "Poison Control Center, Durham" number is 1-800-672-1697.
15. The "National Response Center, Oil and Toxic Chemical Spills" number is 1-800-424-8802.

High Pressure Hoses

Hazard Review

Pressurized Water/Air/Oil

Lifting

Slip/Trip/Fall

1. High pressure hoses should not be kinked. Check hose fittings for proper connections.
2. Operator should never leave machine while pumping is in process.
3. Only nozzle operator will direct the pump operator when to start pump.
4. Make sure all hoses and nozzles are in good shape.
5. Do not stand over hoses.
6. Watch for slipping/tripping hazards in the work area.
7. Use proper lifting procedures for moving hose and placing bagged material.
8. Clean machine properly and thoroughly at end of shift.
9. Make sure all dead man shut-off valves work properly.
10. Do not allow heavy equipment to run over hoses.
11. Do not point outlet end in direction of other personnel in the work area.
12. Make sure safety chains are properly attached at connections.

Jump Starting

Hazard Review

Fire	Moving Traffic	Corrosive Acid
Electrical Shock	Eye Injury	Parking
Toxic Materials	Explosive Gases	Slip, Trip and Fall

1. Improper procedures or techniques may result in personal injury and/or damage to the electrical system or computer components.
2. Employee **MUST COMPLETE BATTERY TRAINING** before jump starting equipment.
3. Is the vehicle in a safe location to be jump started?
4. If the battery is distorted/deformed, cracked, leaking, or missing a vent cap, **DO NOT** jump start, call for assistance.
5. Wear appropriate personal protective equipment consistent with the hazard. Eye protection is required.
6. When working at night, have adequate lighting available.
7. Avoid leaning over the battery whenever possible.
8. Do not expose the battery to open flames or sparks (**NO SMOKING**).
9. Be sure any batteries that have filler caps are properly filled with fluid.
10. Do not allow battery acid to contact eyes or skin.
11. Both discharged and charged batteries must be of the same voltage.
12. Do not stand between vehicles.
13. Use proper procedure in accordance with the operator's manual. If no special instructions apply, proceed as follows for negative grounded batteries:
 - Make the jumper connections
 - *Connect one end of the red jumper cable to the positive (+) terminal of the booster battery and the opposite end to the positive (+) terminal of the discharged battery
 - * Connect one end of the black jumper cable to the negative (-) terminal of the booster battery and the opposite end to an engine bolthead or good metal contact on the vehicle to be started, not to the negative battery terminal of the discharged battery
 - Check the cables to make sure they will not be in the way of moving parts when the vehicle is started
 - Start the engine of the vehicle with the good battery and run it at a moderate speed
 - Start the engine of the vehicle with the discharged battery
 - Remove all cables in reverse sequence. Begin by removing the cable from the engine of the vehicle that had the discharged battery.
14. Keep hands and equipment from all moving parts, belts, machinery, etc.
15. Never use external heat to aid in starting equipment when volatiles are present.

Lockout/Tagout

LockOut/TagOut procedures are designed to isolate or shut off machines and equipment before employees perform any servicing or maintenance work. Each person who may work on equipment shall be trained on this standard before conducting any work. General guidelines for implementing this standard are:

1. Only persons who are trained and authorized may work on equipment.
2. All machinery and equipment which may be started or which may release energy during servicing must be positively locked out.
3. All employees must honor lockout/tagout devices. No employee may remove a lock unless they have installed it.
4. Each person performing service or maintenance work must have his own individual lockout device. Locks must be standardized by color, shape, size or type.
5. Employees implementing a lockout procedure shall notify employees in the immediate vicinity of his actions.
6. Machinery or equipment shall be shut down through its normal stopping procedure before the lockout device is applied.
7. The lockout device shall be installed at a place where the machinery or equipment can be isolated from its energy source.
8. The equipment shall then be checked to ensure that it is inoperable before any work is performed.
9. The machinery or equipment shall not be restored to operation until all tools are removed and a check is made to ensure no personnel are in a hazardous area.

Rigging

Hazard Review

Crushing Injuries	Electrical Shock	Equipment Limitations
Slip, Trip and Fall	Flying Particles	Lifting
Material Under Stress	Overhead Loads	Pinch Points
Power Equipment Operations	Rope or Cable Blocks	
Utility Lines		

1. Before use, inspect cable, chain or wire rope for wear and replace if necessary.
2. Observe OSHA guidelines for use of cable clamps, safety latches, chains and slings.
3. Know rated capacity of cable, chain or wire rope being used.
4. Avoid overloading and sudden jerks.
5. Wear appropriate personal protection equipment consistent with the hazard, including hard hats, safety glasses and work gloves.
6. Loads to be lifted shall be checked for balance and the rigging inspected to ensure a safe and balanced condition.
7. Employees shall not stand or work under suspended loads.
8. Awkward loads should have taglines attached to control the load.
9. Review signals and operator communications. Only one person shall direct the operator.
10. Review the area for utility lines, tree limbs and other overhead safety hazards.
11. Personnel working tag lines should review area for slipping, tripping and falling hazards. If not possible to eliminate them, then take precautions to avoid them.

Asphalt Distributor/Kettle

Class Code 0206, 0219, 1300, 1302, 1306

Hazards

Traffic	Mounting/Dismounting	Backing
Flammable Liquids		

1. All drivers shall be properly licensed.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
4. Always know location of fire extinguishers and ensure that they are properly charged. Remove fire extinguisher and have nearby prior to firing distributor.
5. Use gloves or insulated material when handling heated spray bar sections or hoses.
6. To avoid having hot material overflow from the tank, allow sufficient space in the tank for expansion of the material when heated. Do not overfill. Keep tank and burner areas clean.
7. To prevent an explosion or possible fire, do not operate burners unattended, while vehicle is in motion or in a confined area.
8. To prevent a possible explosion, do not heat material beyond manufacturer's recommended temperature. Do not light burner(s) unless the flue is covered by a minimum of 6 inches of asphalt.
9. Plan ahead to minimize or eliminate backing. Always check to the rear before backing and use an observer if available. Make sure back-up alarms are working properly.
10. No personnel shall be allowed to ride on the rear, i.e., when the vehicle is equipped with interior cab-mounted controls. If a greater hazard is created by using cab-mounted controls, such as when maneuvering on narrow, twisting roadways, personnel may be allowed on the rear of the vehicle, if adequate fall protection is provided.
11. Make sure appropriate decals and placards are displayed on distributor.
12. Operators and passengers shall wear seat belts and shoulder harnesses as provided.
13. Wear appropriate personal protective equipment consistent with the hazard.
14. Operators should be aware of employees and others on foot in work zone.
15. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
16. If vehicle is equipped with A.C. engine heater and/or tank heater, first switch current off and then unplug heater before operating either piece of equipment.
17. Operator shall stop at all unsignalized railroad grade crossings.
18. Eye protection is required when loading or unloading material.

Related SOPs

General SOPsChapter 10

Bark Spreader

Class Code 0212, 4114

Hazard Review		
Backing	Mounting/Dismounting	Flying Objects
Unsecured Loads		

1. All drivers shall be properly licensed.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and/or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
8. No personnel shall be allowed to ride anywhere except in the cab when the vehicle is in motion unless the vehicle is designed to accommodate an individual outside the cab.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. Make sure cargo is properly loaded, secured and covered. Check for loose material on bed rails and chassis.
14. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
15. Be aware of overhead utility lines when spreading material.
16. When operating vehicle off the roadway, be aware of hidden objects in the grass and unstable terrain.
17. Make sure area to be mulched is clear of people, other equipment and vehicles.
18. Operator is to be aware that there will be flying debris. Watch for passing traffic.
19. Keep height of blower adjusted.
20. Stay off hills and slopes too steep for safe operation.
21. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs

General SOPsChapter 10

Broom

Class Code 0306, 1400,1402,1404, 1406

Hazards

Traffic

Dust

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Check frame for cracks and loose bolts.
3. If visual obstruction due to sweeping causes potential traffic hazard, use alternate method for traffic control.
4. Check for proper hook-up of sweeper to towing vehicle and use safety chain. Check chain before leaving yard.
5. Operators should be aware of employees and others in work zones.
6. Keep hands and feet clear when adjusting sweeper angle.
7. While driving, always scan the entire area for possible hazardous situations.
8. When deadheading, make sure broom is raised and locked in place.
9. Use water to control dust.
10. Protect towing vehicle from rock damage.
11. Operators shall wear seat belt and/or shoulder harnesses as provided.
12. Wear appropriate personal protective equipment consistent with the hazard. Dust mask and eye protection should be worn.
13. When in operation, only the operator shall be permitted on the machine.
14. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
15. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
16. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.

Related SOPs

General SOPsChapter 10 Wheel TractorPage 12A-25

Crane/Dragline

Class Code 2702, 2703

Hazard Review		
Traffic	Swinging Loads	Parking
Suspended Loads	Lifting	Noise

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Do not operate boom within 10 feet of power lines.
3. Check boom daily for cracks, deformities, oil leaks or loose pins, nuts and bolts.
4. Check boom hook for cracking or spreading and loose pins.
5. Make a daily check of wire rope, cable or chains for deformities.
6. Before traveling, check boom for proper storage position.
7. Workers shall not be allowed under boom during operation.
8. Never exceed maximum lifting capacity of boom.
9. Only one person shall operate the crane and only one person shall signal and assist the operator.
10. Do not rock the boom and always use a smooth pull.
11. Crane deck shall be kept clean and free of obstructions.
12. When swinging boom, change direction slowly.
13. Do not pull objects directly toward operator position.
14. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
15. Do not use chain and grab hooks when working on mats.
16. Position drop line as close as possible to the balance point of the load.
17. Crane shall be made level before beginning work.
18. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
19. Operators should be aware of employees and others on foot in work zones.
20. Operators should make a visual inspection of work area prior to beginning work.

Related SOPs	
General SOPs	Chapter 10 Rigging.....Page 11E-8
Excavating, Trenching and Shoring	Page 11E-2

Hydraulic Excavator

Class Code 1852, 1853

Hazard Review

Mounting/Dismounting

Backing

Underground/Overhead Conflicts

1. Supervisors shall verify that drivers are capable and are qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Drivers shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
3. Operators shall wear seat belts and or shoulder harnesses as provided.
4. Keep windshield, windshield wipers, side windows and mirrors clean.
5. When mounting or dismounting equipment use steps and hand holds provided. Do not jump from vehicle.
6. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
7. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
8. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
9. Wear appropriate personal protective equipment consistent with the hazard.
10. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
11. Operators should be aware of employees and others on foot in work zones and be sure area is clear of personnel before lowering stabilizers or moving the boom.
12. Do not leave attachments in the raised position when equipment is not in use. Always lower them to the ground.
13. When in operation, only the operator should be permitted on the machine.
14. Be sure outriggers are properly set before operating backhoe.
15. Never allow anyone to work under a raised bucket.
16. Do not operate boom within 10 feet of energized power lines.
17. Utilize trailer whenever possible to transport excavator.
18. Before digging, review excavating, trenching and shoring guidelines as contained in Chapter 11E of this manual.
19. Operators should make a visual inspection of work area prior to beginning work.

Related SOPs

General SOPsChapter 10 Trailers and Towed EquipmentPage 12B-29
Excavating, Trenching and ShoringPage 11E-2

Fork Lift

Class Code 4135, 4136, 4159

Hazards		
Unsecured Loads	Backing	Overhead and Side Clearances

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Rated capacity must be stated on forklift. Do not overload.
4. Riders shall not be permitted on forklifts.
5. Loaded forklifts shall not be moved until load is safe and secure.
6. All unattended forklifts shall have mast at vertical position, forks in the down position, engine off and parking brake set.
7. Forklifts shall not be driven up to anyone standing in front of a bench or fixed object where such person could be caught between the forklift and object.
8. Operators shall look in the direction of travel and not move forklift until certain that all persons are clear.
9. The forks shall always be carried as low as possible. Make sure counterweights are in place.
10. Forklifts shall not be driven into and out of trailers at loading docks until such trailers are securely blocked and brakes set.
11. Employees shall not place any part of their body outside the running lines of the forklift or between mast uprights or other parts of the unit where shear or crushing hazards exist.
12. Employees shall slow down and sound horn at all locations where visibility is obscured or obstructed. If the load being carried obstructs forward view, the operator shall be required to travel with the load trailing. Avoid sharp turns and sudden starts and stops.
13. Employees shall not be allowed to stand, pass, or work under the elevated portion of any forklift.
14. Extreme care shall be taken when tilting loads. Tilting forward with forks elevated shall be prohibited except when picking up a load. Tilting elevated loads forward shall be prohibited, except where the load is to be deposited on a storage rack or equivalent.
15. Special precautions shall be taken in the securing and handling of loads by forklifts equipped with special attachments and during the operation of these trucks after loads have been removed.
16. Employees shall only be lifted in forklifts designed specifically for this use.
17. When the forklift is in motion, the masts should be tilted. When forks are empty, mast should be tilted to the rear to prevent tips of forks from contacting ground. When the forklift is parked, the tips should be flat on the ground.
18. Check overhead clearance of doorways and entrances.
19. If equipment has air brakes, be sure pressure is up before moving.
20. Avoid abrupt hydraulic system movement which could rupture hydraulic hoses.

Related SOPs
General SOPsChapter 10

Grader

Class Code 0900

Hazard Review

Backing	Mounting/Dismounting	Inclement Weather
Low Overhead Objects	Slow Moving Equipment	

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Keep windshield, windshield wipers and mirrors clean.
4. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
5. When operating grader, be aware of protruding or overhanging objects or limbs.
6. When traveling, make sure blade is properly positioned under grader. Slow down when crossing railroad tracks.
7. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
8. Be on the lookout for hazards in or adjacent to the travel way, such as bridge joints, curbs, manhole covers and other utilities.
9. Operators shall wear lap belt while seated or standup harness while standing, if possible.
10. Tire chains should be utilized as dictated by weather conditions.
11. Operators should be aware of employees and others on foot within work zone.
12. When in operation, only the operator shall be permitted on the machine.
13. Operators shall never allow machine to coast downhill with transmission in neutral.
14. Use extreme caution when operating grader on steep slopes or along the edge of fills to avoid overturning.
15. Grader should be parked with blade in down position. Shut off engine when equipment is not in use.
16. If operating grader with door open, make sure it is properly fastened. Do not attempt to open or close door when moving.
17. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
18. When deadheading use low volume roadways if available. Pull over to allow vehicles to pass.
19. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs

General SOPsChapter 10 Rotary Slope MowerPage 12A-18

Hydro Seeder

Class Code 0206, 4107

Hazard Review		
Mounting/Dismounting	Overhead Dangers	Backing

1. All drivers shall be properly licensed.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and hand holds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion, unless the vehicle is engaged in normal daily work operations, i.e. herbicide spraying, spreading straw, blowing mulch, etc.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. Make sure cargo is properly loaded, secured and covered. Check for loose material on bed rails, chassis and operator platform.
14. For inclement weather, truck speed should be adjusted for load and weather.
15. Be aware of utility lines and other overhead dangers when spreading material.
16. When operating vehicle off of the roadway, be aware of hidden objects in the grass and unstable terrain.
17. Insure safety rails are in place.
18. Apply tank mixture to target areas only. Avoid operating during strong winds.
19. Stay off hills and slopes too steep for safe operations.
20. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
21. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs

General SOPsChapter 10

Lawn Mower

Class Code 2310-2370

Hazard Review

Flying Objects
Noise

Steep Terrain

Roll Over

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Check condition of drive belts before starting.
3. Check area and clear rocks and debris before mowing.
4. Clear all persons from path of potential flying objects.
5. Avoid entangling blade in wires, ropes, or cables.
6. Make sure seat is properly secured to machine.
7. Make sure mower is in neutral or park before starting.
8. Do not carry passengers on mower.
9. Use mower only for its designed purpose.
10. Use care while operating over uneven terrain.
11. Do not dismount machine unless stopped.
12. Disengage mower when not cutting.
13. Wear appropriate personal protective equipment consistent with the hazard. Eye protection is required.
14. Keep feet and hands clear of mower blades.
15. Do not refuel a running or hot engine.
16. Keep all guards in place at all times.
17. Keep off slopes too steep for safe operation.
18. Never attempt to start or operate the machine except from the operator's station.
19. Check frame and mower deck for cracks and loose bolts.

Related SOPs

General SOPsChapter 10

Force Feed Loader

Class Code 2009

Hazard Review

Traffic	Dust	Moving Belts
Backing		

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
3. Travel slowly when moving over rough terrain.
4. Never drive too close to edge of a ditch, fill slope or excavation.
5. Watch for overhead obstructions.
6. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.
7. While driving, always scan the entire area for possible hazardous situations.
8. Never attempt to start or operate the machine except from the operator's station.
9. Do not oil, grease or adjust the unit while it is in motion.
10. Operator and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
11. Use shovel or other tool to unclog belt. Never try to unclog the belt by hand. (System must be shut down when performing this function.)
12. Wear appropriate personal protective equipment consistent with the hazard.
13. Be familiar with all safety shut down devices.
14. Operator should be aware of employees and others on foot in work zones.
15. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
16. When in operation, only the operator shall be permitted on the machine.
17. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
18. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
19. Keep windshield, windshield wipers, side windows and mirrors clean.
20. Wear appropriate personal protective equipment consistent with the hazard.

Related SOPs

General SOPs	Chapter 10	Broom.....	Page 12A-3
Dump Truck.....	Page 12A-30		

Front End Loader

Class Code 2002, 2008, 2014

Hazard Review

Overloading	Mounting/Dismounting	Backing
Roll Over	Steep Terrain	

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
3. Wear appropriate personal protective equipment consistent with the hazard.
4. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
5. Operators shall wear seat belts and/or shoulder harnesses as provided.
6. Keep windshield, windshield wipers, side windows and mirrors clean.
7. Make visual inspection of work area before starting operations.
8. When in operation, only the operator shall be permitted on the machine.
9. Carry bucket low to ground (loaded or unloaded).
10. Stop loader with brakes, not transmission.
11. Do not operate the loader or controls from any position other than the operator's seat.
12. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
13. Operators should be aware of employees and others on foot in work zones.
14. Do not swing bucket over truck cab or ground crew.
15. Build berm prior to dumping over banks.
16. When operating machine on side hill, never allow anyone to remain downslope while machine is in motion.
17. Never allow machine to coast downhill with transmission in neutral.
18. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots. Properly secure equipment.
19. Engage safety steering lock while holding and before working on loader.
20. Always lock equipment properly when parking overnight or for an extended period.
21. When deadheading, use low volume roadways if available. Pull over to allow vehicles to pass.
22. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs

General SOPs	Chapter 10	Trailers and Towed Equipment	Page 12B-29
Dump Truck.....	Page 12A-30		

Centerline Paint Machine

Class Code 1450

Hazard Review		
Backing	Unsecured Loads	Pressurized System
Mounting/Dismounting	Fire	Noise

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and hand holds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. When doing emergency maintenance, be aware of hazards as a result of other vehicle traffic and to other personnel.
14. Be aware of overhead obstructions.
15. When operating vehicle off of the roadway, be aware of hidden objects in the grass and unstable terrain.
16. Check paint valves and hoses for wear and leaks.
17. Be sure there is no pressure on paint system when setting up, cleaning, pulling filters, or servicing guns.
18. Choose place for setting up away from traffic, if possible.
19. No smoking or open flames allowed in immediate area of pumping paint.
20. When securing at end of day, bleed entire system of pressure. Never leave pressure in system. Check air valves and hoses for wear and leaks.
21. Do not use pressurized air to clean yourself.
22. Have a communication system between driver and operator.
23. Use appropriate DOT hazard class placard for material being used.
24. Release pressure on bead tank, paint and solvent tanks before removing lid.
25. Be aware of fire hazards from paint and solvents, overflow onto furnace.
26. The use of shadow vehicle with impact attenuator is recommended for high volume roadways.
27. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.
28. Operator shall stop at all unsignalized railroad grade crossings.

Related SOPs

General SOPsChapter 10 Hand Tools (Power and Manual)Page 12B-13

Pavement Grinder

Class Code 1011, 2214

Hazards

Traffic	Mounting/Dismounting	Backing
Flying Objects		

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Check cutting teeth before operating and familiarize yourself with equipment controls and their functions.
3. Never attempt to start or operate the machine except from the operator's station.
4. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
5. Never stand behind or in front of the machine when the engine is being started or grinding pavement. Grinders may lunge rearward unexpectedly.
6. Always use two employees when loading or unloading equipment. When preparing for transport, place block of wood under grinder head after equipment is loaded on trailer.
7. Before adjusting, lubricating or fueling the equipment, move the grinder drum engagement lever to the off position, set the brake, shut off the engine and block the wheels if on an incline.
8. Always come to a complete stop and stop grinder head before reversing the direction of the machine while grinding.
9. Always use caution when turning or crossing near traffic. The machine moves slowly and requires more time to maneuver than other equipment.
10. Always align the rear wheels with the frame when deadheading the machine.
11. Wear appropriate personal protective equipment consistent with the hazard.
12. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
13. Keep machine clean.
14. Always use water when grinding.
15. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
16. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.
17. When in operation, only the operator shall be permitted on the machine.
18. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
19. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.

Related SOPs

General SOPsChapter 10 Paving Machine/WidenerPage 12A-14

Paving Machine/Widener

Class Code 1150, 1153, 1154

Hazards		
Traffic	Hot Asphalt	Mounting/Dismounting

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Proper use of cleaning agents is imperative.
4. One person only shall direct truck drivers backing into or leaving paver.
5. Wear appropriate personal protective equipment consistent with the hazard.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from equipment.
7. Never attempt to start or operate the machine except from the operator's station.
8. Be aware of hot places on paver to avoid burns.
9. Do not leave paver unattended when heating screed.
10. Use caution when loading/unloading paver from trailer, especially in wet or damp conditions.
11. When transporting paver or trailer, check to be sure load is properly secured.
12. Be aware of fire extinguisher locations on equipment and make sure they are properly charged.
13. When transporting oversize loads, operator should obtain proper permit.
14. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.
15. Operators should be aware of employees and others on foot in work zones.
16. Use caution when handling hot/flammable materials. Review MSDSs for each material used.

Related SOPs

General SOPs	Chapter 10	Dump Truck	Page 12A-30
Patch Rollers	Page 12A-16		

Post Driver

Class Code 1730

Hazards

Traffic	Crushing	Flying Objects
Backing		

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
4. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.
5. Travel slowly when moving over rough terrain.
6. Never drive too close to the edge of a ditch or excavation.
7. Watch for overhead wires.
8. Reduce speed before turning or applying brakes. Couple the brake pedals together when traveling at high speed. Be sure that both wheels are braked simultaneously when making an emergency stop.
9. Never attempt to start or operate the machine except from the operator's station.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Keep all persons away from unit when it is in operation.
12. Watch for debris when driving wooden posts.
13. Keep posts plumb and firmly attached.
14. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
15. When in operation, only the operator shall be permitted on the machine.
16. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.

Related SOPs

General SOPsChapter 10 Wheel TractorPage 12A-25

Patch Rollers

Class Code 2502, 2504, 2510

Hazard Review		
Rollover	Towing	Hooking/Unhooking
Mounting/Dismounting	Traffic	

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Never attempt to start or operate the machine except from the operator's station.
4. Remain in seat while operating. Wear seat belt if equipped with rollover protection.
5. When mounting or dismounting equipment, use steps and hand holds provided. Do not jump from equipment.
6. Wear appropriate personal protective equipment.
7. Choose safest location to park equipment. Avoid parking in other equipment's blind spot.
8. When in operation, only the operator shall be permitted on the machine.
9. Use caution when operating roller on steep grades.
10. Keep area clear when operating roller. Be aware of location of any stationary objects in area.
11. Always completely stop roller before changing directions.
12. Operator should be aware of employees and others on foot in work zones.
13. Do not allow anyone to get between roller and truck while coupling.
14. When rolling patches or edges, do not get too close to edge of pavement to avoid rollover.
15. Hook and unhook patch rollers on stable ground. Use a guide when hooking to vehicle. Set parking brake on roller to prevent bending hydraulic tongue. Chocks should be used on slopes.
16. Use locking pins when wheels are in up or down position.
17. After disconnecting, both roller drums should be on ground.
18. Use caution when loading/unloading steel wheel roller from trailer especially in wet or damp conditions.
19. When transporting roller on trailer, check to be sure load is properly secured.
20. Observe recommended towing speed limit of the machine.
21. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
22. Operator should be aware of employees and others on foot in work zones.

Related SOPs	
General SOPs	Chapter 10 Crew Cab and Flatbed TrucksPage 12A-29
Dump Trucks.....	Page 12A-30 Trailers and Towed EquipmentPage 12B-29

Sheepfoot/Rubber-Tired/Vibratory Rollers

Class Code 2500, 2504, 2506, 2507, 2512

Hazard Review

Rollover	Towing	Hooking/Unhooking
Mounting/Dismounting	Traffic	

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Remain in seat while operating. Wear seat belt if equipped with rollover protection.
4. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from equipment.
5. Wear appropriate personal protective equipment.
6. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
7. When in operation, only the operator shall be permitted on the machine.
8. Use caution when operating roller on steep grades and fill edges.
9. Keep area clear when operating roller. Be aware of location of any stationary objects in area.
10. Always completely stop roller before changing directions.
11. Operator should be aware of employees and others on foot in work zones.
12. Use guide when hooking towed sheepfoot or vibratory roller to tractor. Check pin and coupling for wear.
13. Never attempt to start or operate the machine except from the operator's station.
14. Check sheepfoot roller periodically and remove roots, wire, rock, etc., caught between feet.
15. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
16. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
17. Make sure equipment is properly secured prior to transporting.

Related SOPs

General SOPs	Chapter 10	Wheel Tractor	Page 12A-25
Trailers and Towed Equipment	Page 12B-29	Dump Truck	Page 12A-30

Rotary Slope Mower

Class Code 0302, 0311, 0900, 2307, 2308

Hazard Review		
Backing	Mounting/Dismounting	Low Overhead Objects
Noise	Flying Objects	Traffic

1. Supervisors shall verify that operators are capable and qualified on equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Keep windshield, windshield wipers and mirrors clean.
4. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
5. When operating grader, be aware of protruding or overhanging objects or limbs.
6. When traveling, make sure that mower is properly positioned.
7. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
8. Be on the lookout for hazards in or adjacent to the travel way such as bridges, signs and utilities.
9. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
10. Operators shall be aware of employees and others within work zone.
11. When in operation, only the operator shall be permitted on the machine.
12. Operators shall never allow machine to coast downhill with transmission in neutral.
13. Wear appropriate personal protective equipment consistent with the hazard.
14. Periodically check blades and mower side shield. Do not leave attachments in raised position when it is not in use. Always lower to the ground.
15. Check work area for debris and utility pedestals the cutter might hit or pick up.
16. Always cut machine off when servicing or dismounting grader. Failure to do so may result in serious bodily injury. All safeguards are to be in place and secure.
17. Stay off slopes too steep for safe operation.
18. Transport cutter with the head in transport position.
19. Watch for overhead clearances.
20. Operate with cutterhead away from operator's cab whenever possible so that operator will be looking at top of mower deck rather than underside of mower.

Related SOPs

General SOPs	Chapter 10	Grader.....	Page 12A-7
Wheel Tractor.....	Page 12A-25		

Scraper

Class Code 2602, 2604

Hazard Review

Overloading	Mounting/Dismounting	Backing
Rollover	Steep Terrain	

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
3. Wear appropriate personal protective equipment consistent with the hazard.
4. When mounting or dismounting equipment use steps and handholds provided. Do not jump from vehicle.
5. Operators shall wear seat belts and/or shoulder harnesses as provided.
6. Keep windshield, windshield wipers, side windows and mirrors clean.
7. Make visual inspection of work area before starting operations.
8. When in operation, only the operator shall be permitted on the machine.
9. Stop scraper with brakes, not transmission.
10. Do not operate the scraper or controls from any position other than the operator's seat.
11. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
12. Operators should be aware of employees and others in work zones.
13. When using self-propelled scraper, attention by both the operator and dozer operator to protect against personal injury and equipment damage should be exercised. Close communication between the operators before and during the job is necessary.
14. When using self-loading scraper, no one should approach the paddles while motor is running.
15. When parking, set parking brakes, lock transmission and place bowl on ground. Turn off switch and remove key. Properly secure equipment.
16. When operating machine on side slope, never allow anyone to remain downslope while machine is in motion.
17. Speed should be adjusted for load and conditions.
18. Operators should make a visual inspection of work area prior to beginning work.

Related SOPs

General SOPsChapter 10 Crawler TractorPage 12A-23
Sheepfoot/Rubber-Tired/Vibratory RollersPage 12A-17

Snooper Crane

Class Code 1803

Hazard Review

Traffic	Extreme Heights	Mounting/Dismounting
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1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator’s manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Do not operate boom within 10 feet of power lines.
3. Check boom and boom hook daily for cracks, deformities, oil leaks or loose pins, nuts and bolts.
4. Make a daily check of wire rope, cable or chains for deformities.
5. Before traveling, check boom for proper storage position. Never travel with PTO engaged.
6. Never exceed maximum lifting capacity of boom in its different positions. Refer to load chart.
7. Only one person shall operate the boom and only one person shall signal and assist the operator.
8. Check and use outrigger safety locks and warning lights. Keep outriggers in sight while lowering.
9. Do not operate boom unless outriggers are down. Do not use outrigger for lifting.
10. When swinging boom, change directions slowly. Do not rock the boom.
11. Operators should be aware of employees and others on foot in work zones.
12. When working in bucket, hard hats and safety harnesses must be worn. Use PFD when working over water. Wear appropriate personal protective equipment consistent with the hazard.
13. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
14. Safety harness must be attached when entering/exiting buckets.
15. All unauthorized personnel shall be kept clear of the operation.
16. Workers shall not be allowed under boom during operation.
17. Check load capacity of the bridge before operating a snooper crane from the deck.
18. All drivers shall be properly licensed.
19. Keep windshield, windshield wipers, side windows and mirrors clean.
20. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion unless the vehicle is designed to accommodate an individual outside the cab.
21. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
22. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
23. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.

Related SOPs

General SOPsChapter 10

Aggregate Spreader

Class Code 2853

Hazards

Traffic	Flying Objects	Backing
Mounting/Dismounting		

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Follow factory instructions when installing or removing the spreader hopper. Avoid pinch points and make sure chains and hooks are properly positioned.
3. Two operators shall be used to operate spreader. No person or operator is to ride in or on the front hopper or spreader box.
4. Material feed belts should be checked for centering, adjustment and condition.
5. When the spreader is being moved from one location to another job-site (deadheading) only the operator shall ride on the spreader.
6. Deadhead spreader with hopper empty or no more than one-quarter full.
7. Check for proper function of all electrical switches and hydraulic valves prior to receiving first load of material.
8. Coordination between operators and truck drivers is essential. A pre-job discussion concerning truck flow patterns will increase efficiency and reduce accident potential by minimizing long distance backing. One person shall be designated to direct truck drivers.
9. Caution shall be used when starting and stopping on grades.
10. Operators should be aware of employees and others on foot in work zones.
11. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
12. Before cleaning debris from rear hopper, conveyor belts, front hopper screen or adjusting or cleaning front hopper gates, stop the spreader, lock the parking brake, and shut off both conveyors, spreadroll and agitator.
13. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
14. Use caution when installing or removing spreader hopper. Properly secure load. Avoid pinch points.
15. Operate the spreader using the existing workstations and staying within areas protected by guardrails. Guardrails shall be 42 inches high with midrail and toe board.
16. Chain on guardrails shall be in place during operation.
17. Make sure equipment is properly secured prior to transporting.
18. Do not leave loose objects lying on spreader.
19. When transporting oversize loads, operator should obtain proper permit.
20. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided only if rollover protection is provided.
21. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
22. Wear appropriate personal protective equipment consistent with the hazard.
23. Stay clear of both front and rear hoppers and all moving parts, cables, shafts, belts, flywheels, etc.

Related SOPs

General SOPs	Chapter 10	Dump Truck	Page 12A-30
Tractor Truck and Trailer	Page 12A-36	Trailers and Towed Equipment	Page 12B-29

Backhoe and Loader

Class Code 0304

Hazard Review

Mounting/Dismounting	Backing	Underground/Overhead Conflicts
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1. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Drivers shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
3. Operators shall wear seat belts and/or shoulder harnesses as provided.
4. Keep windshield, windshield wipers, side windows and mirrors clean. Make sure that the mirrors provide a large as possible view of the rear.
5. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
6. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
7. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
8. Wear appropriate personal protective equipment consistent with the hazard.
9. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
10. Operators should be aware of employees and others on foot in work zones and be sure area is clear of personnel before lowering stabilizers or moving the boom.
11. Do not leave attachments in the raised position when equipment is not in use; always lower to the ground.
12. When in operation, only the operator should be permitted on the machine.
13. Be sure outriggers are properly set before operating backhoe.
14. Never allow anyone to work under a raised bucket.
15. Do not operate backhoe boom within 10 feet of energized power line.
16. Utilize trailer whenever possible to transport backhoe. Use swing and boom locking pins when transporting.
17. Make sure equipment is properly secured prior to transporting.
18. Before digging, review excavating, trenching and shoring guidelines found in Chapter 11 E.
19. When operating on slopes, use caution when swinging bucket in the downhill direction. Dump on the uphill side. Keep loader bucket low when moving.
20. Select loading areas that are as level as possible.
21. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.

Related SOPs

General SOPs	Chapter 10	Excavating, Trenching and Shoring	Page 11E-2
Trailers and Towed Equipment	Page 12B-29		

Crawler Tractor

Class Code 0405, 0408

Hazard Review

Mounting/Dismounting	Backing	Inclement Weather
Steep Terrain		

1. Supervisors shall verify that operators are capable and qualified on equipment before allowing the equipment to be operated.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
4. Operator should make a visual inspection of work area prior to beginning work.
5. When in operation, only the operator should be permitted on the machine.
6. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
7. Never allow machine to coast downhill with transmission in neutral.
8. When involved in clearing operations, operator should be conscious of possible falling debris from overhead. An observer shall be used when visibility is obstructed.
9. Operator should lower ripper and blade to the ground, set foot brake and lock transmission whenever machine is parked.
10. When operating on a side slope, never allow anyone to remain down slope while machine is in motion.
11. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
12. Operator should be aware of employees and others in the work zone.
13. Never attempt to start or operate the machine except from the operator's station.
14. Make sure equipment is properly secured prior to transporting.
15. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
16. Wear appropriate personal protective equipment consistent with the hazard.
17. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.

Related SOPs

General SOPs	Chapter 10	Truck Tractor and Trailer	Page 12A-36
Trailers and Towed Equipment	Page 12B-29		

Mower Tractor

Class Code 0305, 2301-2308

Hazards		
Traffic	Uneven Terrain	Inclement Weather
Rollover	Noise	Flying Objects

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Watch traffic when driving around guide markers, signs, culverts, etc. or anytime machine encroaches on travel lane.
4. Don't mow too close to fences and be alert for utility pole guy wire, concrete right of way markers, etc.
5. Use caution when mowing on steep slopes. Watch for hidden holes or washouts and reduce speed.
6. Use caution when mowing downhill on wet or green grass as brakes are less effective.
7. Shut off tractor when performing equipment repair activities.
8. Keep area clear of personnel on foot.
9. Do not dismount unless motor is off, blades have stopped and brake is set.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Never work under mower unless properly secured with safety stand or safety chain.
12. Keep mower adjusted to proper height above ground to prevent throwing debris.
13. Do not run side mount flail in the up position.
14. Replace missing flail knives to maintain balance.
15. Ensure debris guard is in place and in good condition.
16. Use caution not to place equipment in locations where it is subject to getting stuck.
17. Never attempt to start or operate the machine except from the operator's station.
18. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
19. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.
20. Check frame for cracks and loose bolts.
21. Mower operators should familiarize themselves with this section.

Related SOPs

General SOPsChapter 10 Wheel TractorPage 12A-25

Wheel Tractor

Class Code 0301, 0302, 0305, 0306, 0308, 0311

Hazard Review

Mounting/Dismounting	Backing	Rollover
Crushing/Pinching	Steep Terrain	Traffic

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
3. Do not leave attachments in the raised position when they are not in use. Always lower to the ground.
4. When operating vehicle off of the roadway, be aware of hidden objects in the grass and unstable terrain.
5. Never allow anyone to work under raised attachments without proper safeguards in place and secured.
6. Avoid driving too close to the edge of a ditch, shoulder or excavation.
7. Reduce speed before turning or applying brakes. Couple the brake pedals together when traveling at high speed. Be sure that both wheels are braked simultaneously when making an emergency stop. Drive at speeds slow enough to ensure your safety, especially over rough ground.
8. When driving out of a ditch, gully, or up a steep slope, engage the clutch slowly. Be prepared to de-clutch promptly if the front wheels rise off the ground. Use the same care if rear wheels mire in soft ground or drop into hole. Back the unit out of these spots if at all possible.
9. Never attempt to start or operate the machine except from the operator's station.
10. Protect PTO drive with master guard and shield.
11. Do not oil, grease, or adjust the unit while it is in motion.
12. Operators must wear lap belt and/or shoulder harness if rollover protection is provided.
13. Supervisors shall verify operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
14. When in operation, only the operator shall be permitted on the machine.
15. Never coast or freewheel downhill.
16. Stay clear of all moving parts: shafts, belts, flywheels, fans, etc.
17. Be aware of crushing or pinching hazards when hooking up, using, adjusting or removing attachments.
18. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
19. Keep windshield, windshield wipers, side windows and mirrors clean.
20. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
21. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
22. Check frame for cracks and loose bolts.
23. Make sure equipment is properly secured prior to transporting.

Related SOPs

General SOPsChapter 11 Tractor AttachmentsPage 12B-28

Aerial Device Truck

Class Code 0206, 0205, 1809, 1810

Hazard Review		
Backing	Inclement Weather	Temperature Extremes
Unsecured Loads	P.T.O.	Mounting/Dismounting
Hydraulic System		

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Drivers shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and/or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion unless the vehicle is designed to accommodate an individual outside the cab. However, a traffic control technician is allowed to be in the bucket, with the bucket fully down, while the driver moves the vehicle from one signal head to another within the same intersection.
8. Whenever, an individual is elevated in an aerial truck, there should be a second individual on the ground who has the ability to render aid and assistance if necessary. The second individual may be someone other than a NCDOT employee provided they have been trained in first aid and are instructed on the emergency operation of the aerial device.
9. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
10. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
11. Wear appropriate personal protective equipment consistent with the hazard. Class B hard hats are required when working near overhead electrical lines
12. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
13. Operators should be aware of employees and others on foot in work zones.
14. Be aware of crushing and pinching hazards when using boom.
15. Make sure cargo is properly loaded and secured. Check to make sure boom is secure before traveling.
16. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
17. Always engage vehicle parking brakes and use wheel chocks before operating aerial device.
18. Operator should watch the bucket and boom when beginning boom operation to prevent collision with obstructions.
19. Never exceed the rated load capacity for bucket.
20. When operating vehicle off the roadway be aware of hidden objects in the grass and unstable terrain.
21. Wear safety harness and lanyard when in bucket.
22. Grounding cable required when working around electrical lines or connector.
23. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
24. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs	
General SOPs	Chapter 10 Hand Tools (Power and Manual)Page 12B-13

Asphalt Patcher Truck

Class Code 1012

Hazards		
Traffic	Mounting/Dismounting	Backing
Hot Asphalt	Lifting	

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. All drivers shall be properly licensed.
4. Never wear loose clothing that can get entangled in the working parts of the tools.
5. Maintain proper footing and balance at all times.
6. Operator should be aware of employees and others on foot in work zones.
7. Disconnect all equipment before inspecting or servicing.
8. Always connect hoses to the tool hose couplers before energizing the hydraulic power source.
9. Do not operate the tool at oil temperatures above 140 degrees F.
10. Do not weld, cut with an acetylene torch or hardface the breaker tool.
11. Be sure that all hoses and attachments are put back in truck and properly secured before moving.
12. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
13. Use caution when handling hot/flammable materials. Review MSDS for each material used.
14. Use proper lifting and handling techniques while shoveling asphalt.
15. Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
16. Wear appropriate personal protective equipment consistent with the hazard.
17. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
18. Keep windshield, windshield wipers, side windows and mirrors clean.
19. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
20. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
21. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs	
General SOPs	Chapter 10 Dump TruckPage 12A-30
Patch Rollers.....	Page 12A-16 Hand Tools (Power and Manual)Page 12B-13

Crane Truck

Class Code 1804, 1815

Hazard Review		
Moving Traffic	Swinging Loads	Parking
Suspended Loads	Lifting	Noise

1. All drivers shall be properly licensed.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
4. Do not operate boom within 10 feet of power lines.
5. Check boom and boom hook daily for cracks, deformities, oil leaks or loose pins, nuts and bolts.
6. Make a daily check of wire rope, cable or chains for deformities.
7. Before traveling, check boom for proper storage position. Never travel with PTO engaged.
8. Never exceed maximum lifting capacity of boom in its different positions. Refer to load chart.
9. Only one person shall operate the boom and only one person shall signal and assist the operator.
10. Check and use outrigger safety locks and warning lights. Do not use outrigger for lifting. Keep outriggers in sight while lowering.
11. Do not operate boom unless outriggers are down.
12. Use timber under outriggers for support when operating on soft ground.
13. When swinging boom, change direction slowly. Do not rock boom and always use a straight pull. Do not use boom to push or boom swing to pull.
14. Do not pull objects directly toward operator position; use remote control for the boom.
15. Do not use chain and grab hooks.
16. Operators and passengers (equipment with passenger seating) shall wear seat belts and/or shoulder harnesses as provided.
17. Keep windshield, windshield wipers, side windows and mirrors clean.
18. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
19. No personnel shall be allowed to ride anywhere ,except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
20. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
21. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
22. Wear appropriate personal protective equipment consistent with the hazard.
23. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.

Related SOPs

General SOPsChapter 10 Rigging.....Page 11E-8

Crew Cab and Flatbed Trucks

Class Code 0206, 0209

Hazard Review

Backing	Mounting/Dismounting	Inclement Weather
Unsecured Loads	Proper Tool Storage	

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Drivers shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and/or shoulder harnesses as provided.
5. Keep windshield, wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab or vehicle is being used with mulch blower.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. Make sure cargo is properly loaded and secured with no less than two chains. Hauled vehicles shall be secured with chains pulling from opposite directions. Check for loose material on truck body and chassis.
14. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
15. When operating vehicle off the roadway, be aware of hidden objects in the grass and unstable terrain.
16. Provisions should be made for proper tool and sign storage.
17. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
18. Only approved chain and load binders shall be used.
19. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs

General SOPs	Chapter 10	Snow Plow	Page 12B-23
Trailers and Towed Equipment	Page 12B-29		

Dump Truck

Class Code 0205, 0212

Hazard Review

Backing	Tailgates	Mounting/Dismounting
Inclement Weather	Unsecured Loads	

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Drivers shall perform a pre-operational check of their equipment. Be familiar with operator’s manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment’s blind spots.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. Be aware of crushing and pinching hazards when installing, adjusting or removing tailgates. Get help or use machinery as necessary.
14. Make sure cargo is properly loaded, secured and covered. Check for loose material on bed rails and chassis.
15. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
16. Be aware of overhead utility lines when spreading material.
17. When operating vehicle off of the roadway, be aware of hidden objects in the grass and unstable terrain.
18. Never work under bed when raised without proper bracing in place.
19. Make sure tailgate is unlatched prior to raising bed for dumping and avoid dumping on unlevel side hill terrain.
20. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.
21. All items in the cab areas of the vehicle should be removed or secured in tool boxes. Because of extreme vehicle temperature, items such as aerosol cans or any items who’s contents are under pressure should not be carried inside the cab area of the vehicle.

Related SOPs

General SOPs	Chapter 10	Trucks.....	12A-26–36
In-Body Salt Spreader	Page 12B-25	Material Spreader-Tow Type.....	Page 12B-26
Tailgate Spreader	Page 12B-27	Trailers and Towed Equipment	Page 12B-29
Snow Plow	Page 12B-23		

Field Mechanic's Truck

Class Code 0203, 1820

Hazards

Traffic	Mounting/Dismounting	Backing
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1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and shoulder harnesses as provided.
5. Keep windshield, wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
10. Wear appropriate personal protective equipment consistent with the hazard. Reflective vests shall be worn when servicing vehicles on shoulder of road.
11. Be aware of fire extinguisher locations and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
14. When operating vehicle off the roadway, be aware of hidden objects in grass and unstable terrain.
15. Do not smoke around flammable liquids.
16. Remove regulator valves and install tank caps on oxygen and acetylene tanks when transporting.
17. Make sure cargo is properly loaded and secured. Check for loose material on truck body and chassis.
18. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
19. Field mechanics truck and equipment being serviced should be completely off roadway. If this is not possible, determine traffic control needs from Work Zone Safety Handbook.

Related SOPs

General SOPsChapter 10

Fuel & Lube Truck

Class Code 3151

Hazards		
Traffic	Mounting/Dismounting	Backing
Flammable Liquids		

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Drivers shall perform a preoperational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and shoulder harnesses as provided.
5. Keep windshield, wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
8. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
10. Wear appropriate personal protective equipment consistent with the hazard. A reflective vest is required when servicing vehicles on shoulder of road.
11. Be aware of fire extinguisher locations and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
14. When operating vehicle off the roadway, be aware of hidden objects in grass and terrain.
15. Do not smoke while fueling equipment.
16. Immediately use electrical quick disconnect should accident occur.
17. Lube truck and equipment being serviced should be completely off the roadway. If this is not possible, determine traffic control needs from Work Zone Safety Handbook.
18. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
19. Operator shall stop at all unsignalized railroad grade crossings.
20. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs

General SOPsChapter 10

Geotechnical Truck and Trailer

Class Code 0213,3200

Hazard Review

Loading and Unloading	Backing	Inclement Weather
Unsecured Loads	Mounting/Dismounting	

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be used unsupervised.
3. Drivers shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and/or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Be sure back-up alarms are working properly.
8. Choose safest location possible to park equipment. Avoid parking in blind spots of other equipment.
9. Wear personal protective equipment consistent with the hazard.
10. Be aware of fire extinguisher locations on equipment and make sure that they are properly charged.
11. Operators should be aware of employees and others on foot in work zones.
12. Be aware of crushing and pinching hazards when loading, unloading and fastening down equipment.
13. Make sure cargo is properly loaded, secured and covered using only approved chain and load binders. Check for loose material on bed and trailer.
14. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
15. Operators should always check and be sure of load height.
16. When operating vehicle off the roadway, be aware of hidden objects in the grass and unstable terrain.
17. Periodic checks of equipment on long trips may be necessary to assure load is secure.
18. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
19. Hook/unhook, load/unload on stable ground with trailer secure.

Related SOPs

General SOPs	Chapter 10	Truck Tractor and Trailer	Page 12A-36
Trailers and Towed Equipment	Page 12B-29		

Sign Erector Truck (With Sign Erection Attachment)

Class Code 0203, 4124

Hazard Review

Backing	Mounting/Dismounting	Inclement Weather
Unsecured Loads	P.T.O.	Overhead and Underground Utilities

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere ,except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spots.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
12. Operators should be aware of employees and others on foot in work zones.
13. Make sure cargo is properly loaded and secured.
14. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
15. When operating vehicle off of the roadway, be aware of hidden hazards and unstable terrain.
16. Always set the vehicle emergency brake before beginning crane operation, extend outrigger and use wheel chocks on grades.
17. Never operate the crane near power lines.
18. Always shut the engine off before working on or near P.T.O. System.
19. When operating auxiliary hydraulic equipment, follow manufacturer's guidelines. Never use uninsulated tools near electrical lines.
20. Keep work area clean to avoid stumbling or falling.
21. Be aware of and keep hands and feet clear of pinch points.
22. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.

Related SOPs

General SOPsChapter 10 Hand Tools (Power and Manual)Page 12B-13

Truck Tractor and Trailer

Class Code 0217, 3201, 3203, 3204, 3206

Hazard Review		
Backing	Mounting/Dismounting	Unsecured Loads
Pinching/Crushing		

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Drivers shall perform a pre-operational check of their equipment. Be familiar with operator’s manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and or shoulder harnesses as provided.
5. Keep windshield, windshield wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion, unless the vehicle is designed to accommodate an individual outside the cab.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment’s blind spots.
10. Be aware of crushing and pinching hazards when installing, adjusting or removing chains and binders used to secure loads.
11. Make sure cargo is properly loaded and secured using only approved chain and load binders. Use no less than two chains. Hauled vehicles shall be secured with chains pulling from opposite directions.
12. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
13. Drive defensively, observe speed limits and obey all traffic laws.
14. When transporting oversize loads, operator shall be responsible for obtaining proper permit.
15. Operator should always check and be aware of load height.
16. Hook/unhook, load/unload on stable ground with trailer secure.
17. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.
18. Wear appropriate personal protective equipment consistent with the hazard.
19. Make sure appropriate decals and placards are displayed on vehicles.
20. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
21. If vehicle is equipped with A.C. engine heater, first switch current off and then unplug heater before getting into vehicle.

Related SOPs	
General SOPs	Chapter 10 Trailers and Towed EquipmentPage 12B-29

Work Boat

Class Code 3301, 3302

Hazard Review

Drowning	Slip, Trip and Fall	Lifting
Flammable Materials		

BEFORE LAUNCHING

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Provide a life jacket in good condition for each occupant.
4. Boat must be equipped with a properly charged fire extinguisher, first aid box, boat hooks, paddles and mooring lines.
5. Brief new personnel on safety equipment use and location.
6. Make sure drain plugs are in place.
7. Have sufficient fuel on board for trip.
8. Be sure bow line is attached to bow and secured before backing down launch ramp.
9. When applicable, make radio check with shore facility when working from boat.
10. Make a visual check of hull for rips, tears or holes.
11. Check engine oil and drive oil levels.

AFTER LAUNCHING

12. When fueling, extinguish all open flames and avoid overflow.
13. Check for water leakage from hull or engine.
14. Observe maritime "Rules of the Road".

BOAT TRAILER

15. Back up to trailer with assistance of another person.
16. Check condition of hitch, safety chain, electrical lines, winch and winch cable.
17. Make sure winch is in locked position before moving trailer and boat.
18. Check for proper alignment of boat on rollers and V-block.
19. Check condition of trailer wheels and brakes.
20. Be sure boat is secure before moving.

Related SOPs

General SOPsChapter 10

Wrecker

Class Code 1800, 1801

Hazards		
Traffic	Mounting and Dismounting	Backing

1. All drivers shall be properly licensed.
2. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
4. Operators and passengers shall wear seat belts and shoulder harnesses as provided.
5. Keep windshield, wipers, side windows and mirrors clean.
6. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
7. No personnel shall be allowed to ride anywhere, except in the cab, when the vehicle is in motion.
8. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
9. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.
10. Do not overload truck, and always use proper engine speed and gear ratio.
11. Never travel with the power take off control engaged.
12. When the boom is raised, never put the selector in the down position and let go of the crank. A runaway crank would result. Never use the crank when the boom has a load on it.
13. Never disengage the wrecker service drum engagement control when the cable is loaded.
14. Never apply lubricant or perform any kind of maintenance while wrecker equipment is operating.
15. Always unlatch the hood of the disabled vehicle when lifting its front end. Leave the safety catch engaged.
16. Always turn on flashing lights in traffic when towing disabled equipment.
17. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.
18. Truck speed should be adjusted for load and weather. Tire chains should be utilized as dictated by weather conditions.
19. Be aware of fire extinguisher locations on your equipment and make sure they are properly charged.
20. If disabled equipment cannot be removed from roadway, then determine traffic control needs from the Work Zone Safety Handbook.
21. Operators should be aware of employees and others on foot in work zones.
22. Wear appropriate personal protective equipment consistent with the hazard.
23. Check boom daily for cracks, deformities, oil leaks or loose pins, nuts and bolts.
24. Do not leave equipment unattended with the engine running. Shut off engine and set the parking brake when equipment is not in use.

Related SOPs

General SOPsChapter 10

Air Compressor

Class Code 1500-1512

Hazard Review

Noise	High Pressure Air	Pinching
Traffic	Flying Objects	Explosion

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of all air hoses, couplings and connections to determine if leakage or other damage exists. Be familiar with operator's manual. Do not operate unsafe equipment.
3. Wear appropriate personal protective equipment consistent with hazard. Hearing and eye protection shall be worn when operating the air compressor.
4. Choose safest location to place compressor unit or compressor vehicle within work area.
5. Use wheel chocks to prevent runaways.
6. Decompress air from compressor prior to removing any caps or air equipment attachments such as jack hammers, drills, etc.
7. Keep oils and flammable materials clear of air fittings and joints.
8. Watch for flying sand and other debris when operating compressor. Be aware of wind direction and try to work upwind if possible.
9. Operators should be aware of employees and others on foot in work zones.
10. Make sure hose connections are secure to avoid hose coming loose during use. High pressure air can cause serious injury.
11. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
12. Pressure-relief valve should be checked and the pressure relieved before transporting.
13. At the end of each shift, compressor should be shut down, air receiver condensate drain valve opened and the system allowed to bleed down. Valve should remain open until the system is restarted and air begins to blow off.
14. If compressor is to be used for breathing purposes, the air must be tested to ensure it is at least *class D*.
15. A high temperature and/or carbon monoxide alarm must be installed on oil-lubricated compressors.

Related SOPs

General SOPs	Chapter 10	High Pressure Hoses.....	Page 11E-5
Crew Cab and Flatbed Trucks.....	Page 12A-29	Hand Tools (Power and Manual)	Page 12B-13
Pavement Breaker	Page 12B-18	Trailers and Towed Equipment	Page 12B-29

Truck Mounted Attenuators

Class Code 3230

Hazard Review		
Traffic	Mounting/Dismounting	Backing
Hooking/Unhooking		

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Hook and unhook on level ground.
3. Keep attenuator wheels blocked when attenuator is not mounted to the truck if so equipped.
4. While operating, be aware of overhang, especially when adjacent to guardrails or fixed objects. Move out gradually.
5. Be aware of excessive overhang while backing.
6. Understand that the attenuator, although it protects our driver and the public, will not lessen vehicle roll-ahead if hit from behind.
7. Keep attenuator in the down position while shadowing; raise before deadheading.
8. All repairs and adjustments should be made away from the travel way.
9. Drive carefully while deadheading.
10. Wear seat belt and shoulder harness when operating truck.

Related SOPs	
General SOPs	Chapter 10
Crew Cab and Flatbed Trucks	Page 12A-29
Dump Truck.....	Page 12A-30

Brush Chipper

Class Code 4102

Hazard Review

Flying Objects	Backing	Loose Clothing
Slip, Trip and Fall		

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. As applicable, the chipper should be positioned as far from travel lanes as is feasibly possible. Operations visibility can be enhanced through the use of proper traffic warning and control such as signs, cones and barrels. Consult the applicable traffic control guidelines.
3. Work vehicles should be positioned to minimize the risk of injury from intruding traffic.
4. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
5. Avoid wearing loose clothing such as safety vests. Safety vests shall be removed while operating the brush chipper. Orange-colored clothing such as bright orange tee-shirts and orange hard hat covers shall be substituted for safety vests.
6. Wear appropriate personal protective equipment consistent with the hazard. Eye and hearing protection is required.
7. Ensure that all shields, covers and guards are in place and secure.
8. Ensure that all by-standers are at a safe distance from equipment.
9. Never allow hands to enter the infeed spout. Do not stand directly behind machine when operating.
10. Turn engine off and remove key before making any adjustments or repairs.
11. Ensure safety chains are hooked before towing.
12. Feed short material into chipper by placing it on top of longer material that is feeding into chipper.
13. Never leave machine unattended with the engine running. Shut engine off when not in use.
14. Never try to force-feed larger materials into the chipper than it is designed to accept.
15. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.
16. Be aware of employees and others in work zone. Only those employees feeding brush should be near chipper.
17. Ensure chipper discharge is turned in a safe direction.

Related SOPs

General SOPs	Chapter 10	Crew Cab and Flatbed Trucks	Page 12A-29
Dump Truck.....	Page 12A-30	Trailers and Towed Equipment	Page 12B-29

Chain Saw and All-Purpose Cut-Off Saw

Class Code 4155, 4143, 4144

Hazard Review		
Flying Objects	Kickback	Hidden Objects
Noise	Wind	Poisonous Plants

- Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
- Operators shall perform a pre-operational check of equipment. Be familiar with operator's manual. Report all needed repairs promptly and do not use any equipment that is unsafe.
- Wear appropriate personal protective equipment consistent with the hazard. This should include eye goggles and hearing protection; gloves, chaps and hard hats when felling trees.
- Do not wear loose jewelry and chains. Snug fitting clothing is recommended.
- Always use the following precautions when handling fuel and refueling the power saw:
 - Always store gasoline in an approved container.
 - Do not smoke while handling fuel.
 - Beware of static electricity and sparks between saw and fuel cans (metal and plastic).
 - Always stop the engine to refuel the tank.
 - Avoid spilling fuel or oil. Spilled fuel should always be cleaned up.
 - Do not remove fuel tank cap when engine is running.
 - Move the power saw at least 10 feet from the fueling point before starting the engine.
 - Keep the handles dry, clean and free from oil or fuel mixtures.
- Before you start the engine, make sure the chain or blade is not contacting any object.
- Never start the power saw until you are at the location where you intend to use the saw.
- Do not allow other persons to be near the power saw when starting or cutting.
- Never start cutting until you have a clear work area and secure footing.
- Always hold the power saw firmly with both hands when the engine is running. Use a firm grip with thumb and fingers encircling the power saw handles.
- Keep all parts of body away from the saw chain or blade when the engine is running.
- Do not cut with the power saw above your head to guard against kickback and to help prevent back injuries. Do not contact material with tip of chainsaw.
- Always shut off the engine before putting down the saw .
- Operate the power saw only in well-ventilated areas.
- When operating chain saw, be aware of the stress of the item being cut. Pinching may result on compression side and sudden break may result on tension side.
- During emergencies, look for downed utility lines before cutting with saw.

Related SOPs	
General SOPs	Chapter 10 Hand Tools (Power and Manual)Page 12B-13

Hand-Operated Compactors

Class Code 2511, 4139

Hazards

Traffic

Noise

Trench Collapse

Lifting

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Keep work area clear of tools or obstructions.
4. Operators should be aware of surroundings and have escape route located.
5. Compact material in lifts that are uniform and even.
6. Do not leave tools or materials in areas where vibration from passing compactors could cause them to fall.
7. Use proper procedures for lifting and transporting compactors.
8. Do not leave equipment running while unattended. Shut off engine when not in use.
9. Use proper foot placement and balance when operating equipment.
10. Do not fill fuel tank or remove fuel cap while equipment is running.
11. Do not operate without proper ventilation.
12. Follow Excavation, Trenching and Shoring Standards for work in trenches over four feet in depth.
13. Wear appropriate personal protective equipment consistent with the hazard.

Related SOPs

General SOPsChapter 10 Excavating, Trenching and ShoringPage 11E-2

Concrete Mixer

Hazard Review

Noise

Flying Objects

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Clean drum and moving parts after each use.
4. Keep hands and feet clear of all moving parts.
5. Ensure that area is cleaned and level enough before operating machine.
6. Wear appropriate personal protective equipment consistent with the hazard. Gloves should be worn when working with concrete.
7. Proper lifting techniques shall be used. Get help or use equipment if necessary. Use caution when moving machine and when shoveling materials to avoid back injury.
8. Make sure hose connections are secure to avoid hose coming loose during use. High pressure air can cause serious injury.

Related SOPs

General SOPsChapter 10
Air CompressorPage 12B-1
Trailers and Towed EquipmentPage 12B-29

Crew Cab and Flatbed TrucksPage 12A-29
Hand Tools (Power and Manual)Page 12B-13

Concrete Pump

Class Code 3520

Hazard Review

Lifting

High Pressure Hoses

Concrete Burns

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Insure all connections are correctly attached and tight and leveling screws are in place and tightened.
4. Test start machine and pumping mechanism prior to filling hopper with concrete.
5. After attaching hoses and insuring all clamps and chute locks are closed, use diesel fuel and a slurry mix to lubricate machine and hoses.
6. Never unlock chute when machine is bogged down. Locate blockage (usually a hard lump in hose) and break clot by beating hose with a hammer. Additional water may be needed to pump hose clear.

Related SOPs

General SOPsChapter 10

Concrete Saw

Class Code 4129, 4130

Hazards		
Cutting Blades	Traffic	Noise
Flying Objects		

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Use correct amount of water while operating blade in the cut mode.
4. Check all water hoses for cuts and leaks.
5. Keep all safety guards in place while operating.
6. Check blade nuts for tightness.
7. Do not force or bind blade in slot being sawed.
8. Do not raise protective shield from around blade when operating saw.
9. When installing or changing blade, disconnect spark plug.
10. Operate engine at proper speed. Never alter the rpm or governor setting.
11. Operators should stand away from and to the side of the blade when in use.
12. Use proper procedures for lifting and transporting the equipment. The blade will be disengaged or removed while loading and unloading the equipment.
13. Wear appropriate personal protective equipment consistent with the hazard. Eye and hearing protection are required.
14. Do not fill fuel tank or remove fuel cap while engine is running.
15. Never leave machine unattended with the engine running. Shut off engine when not in use.

Related SOPs
General SOPsChapter 10

Conveyor

Class Code 1600

Hazard Review

Transporting	Pinching & Crushing	Overhead Objects
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1. Supervisors shall verify that operators are capable and qualified on conveyor belt operation before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of the conveyor. Report all repairs immediately. Be familiar with operator's manual. Do not use any equipment that is unsafe.
3. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available.
4. Be aware of crushing and pinching hazards while adjusting conveyor belt. Get help or use machinery when dismantling or erecting same for use.
5. When transporting, obtain proper permit for moving. Have both front and rear shadow vehicles equipped with warning lights when transporting.
6. Vehicles involved in transportation of conveyor should be equipped with radio communication when available.
7. Supervisors shall review route of transporting, insuring of no overhead conflicts.

Related SOPs

General SOPsChapter 10 Truck Tractor and TrailerPage 12A-36

Curb Machine

Class Code 4103

Hazards

Traffic Hot Asphalt

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Choose safest location possible to park machine.
4. Clean hopper and moving parts after each use with proper cleaning solvents.
5. Keep hands and feet clear of all moving parts.
6. Keep hopper properly oiled.
7. Ensure that area is cleaned and level enough before operating machine.
8. When feeding machine, do not insert shovel or other tool in hopper.
9. Wear appropriate personal protective equipment consistent with the hazard. Gloves should be worn when working with hot asphalt.
10. Proper lifting techniques shall be used. Get help or use equipment if necessary. Use caution when pulling machine and when shoveling asphalt to avoid back injury.
11. Do not work in front of machine when it is in operation.
12. Never leave machine unattended with the engine running. Shut engine off when not in use.
13. Do not fill fuel tank or remove fuel cap when engine is running.

Related SOPs

General SOPsChapter 10 Dump TruckPage 12A-30

Fumigation (Gassing) Rig

Attachment to Wheel Tractor

Hazard Review

Hazardous Vapors

1. Operation of fumigation rig will be supervised by individual who possesses an appropriate N. C. Department of Agriculture Pesticide Applicator License.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Rig must be inspected before each day's operation. Check for weak, worn, defective parts and leaks.
4. Inspect, service, clean and replace parts as required before beginning seasonal start-up of rig.
5. Inspect, service, clean and replace parts as required at end of seasonal operation (use) of rig.
6. Label and MSDSs of all fumigants to be used with rig will be reviewed by supervisor with all members of fumigation crew prior to being used. Poison Control Center telephone number should be posted on equipment.
7. Follow label directions.

Related SOPs

General SOPsChapter 10 Wheel TractorPage 12A-25
Tractor Attachments.....Page 12B-28

Generator

Class Code 2101-2104

Hazards

Inclement Weather

Electrical Shock

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Guard against electric shock.
3. Avoid touching live terminals or receptacles.
4. Be extremely careful if operating in inclement weather.
5. Do not make or break electrical receptacle connections under load.
6. Use only grounded receptacles and extension cords. Discard old cords.
7. Generator must be properly grounded.
8. Operators should use caution and remain alert around hot engine parts, moving parts and generator output.
9. Provide safety guards for all drive systems.
10. Keep all safety guards and power shields in position and tightly secured.
11. Do not wear loose clothing, neckties or jewelry that could be caught in moving parts.
12. Provide adequate ventilation when in use.
13. Keep area around generator clean and dry. Remove all material that can create slippery conditions. Remove oily rags and other flammable material from the area.
14. Keep a fire extinguisher near the generator.
15. When transporting, ensure that generator is properly secured.
16. Do not fill fuel tank or remove fuel cap while engine is running.

Related SOPs

General SOPsChapter 10 Field Emergency Response.....Page 11D-1

Hand Tools (Power and Manual)

Hazard Review

Electrical Shock	Noise	Pinch Points
Dust	Sharp Edges and Points	Caustic Cleaning Agents
Flying Particles	Cuts and Abrasions	Improper Tools

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Wear appropriate personal protective equipment consistent with the hazard.
3. Never use a tool to do a job it was not designed to do.
4. Use tools in the manner for which they are designed to avoid tool damage and personal injury.
5. Keep work area clean to avoid slipping, tripping or falling.
6. Avoid using power tools or hand tools which are dull.
7. Power saws, chain saws and drills that have dull blades or bits can cause binding or kickback which can result in cuts, bruises and loss of fingers or limbs.
8. Be aware of safety devices on tools; check regularly and use only tools with all safety devices properly operating.
9. Do not use electric power tools with damaged cords or switches.
10. Place tools in safe position when not in use so that sharp points are not exposed.

Related SOPs

General SOPsChapter 10

Impactor–Asphalt Cutter

Class Code 2215

Hazard Review

Flying Objects	Noise	Traffic
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1. Operators shall perform a pre-operational check of equipment. Be familiar with operator’s manual. Report all needed repairs promptly. Do not operate any equipment that is unsafe. Shut engine off when not in use.
2. Never leave machine unattended with the engine running.
3. Do not leave attachment in the raised position when it is not in use.
4. Locate utilities prior to beginning operation.
5. Never allow anyone to work under raised attachment without proper safeguards in place and secured.
6. Never attempt to start or operate the machine except from the operator’s station.
7. Check bolts, fittings and housing for cracks three (3) times a day.
8. Be sure of position of impactor to surface.
9. Wear appropriate personal protective equipment consistent with the hazard.
10. Operators should be aware of employees and others in work zone.

Related SOPs

General SOPsChapter 10 Backhoe and LoaderPage 12A-22

Ladder

Hazard Review

Pinching

Slip, Trip and Fall

1. Inspect for cracks, breaks or weak points. Replace if found defective.
2. Do not use metal or conductive ladders near energized lines or equipment.
3. When climbing, use rungs for handholds rather than side rails.
4. Utilize middle porting of each rung rather than edges when climbing.
5. Do not climb above manufacturer's recommended height as marked on the ladder.
6. Do not exceed manufacturer's weight capacity for the ladder.
7. Locate base of ladder on firm, level and solid footing. Secure as necessary to provide stability.
8. Use the correct sized ladder for the job. Do not over reach.

Related SOPs

General SOPsChapter 10

Traffic Paint Line Remover

Class Code 1454-1456

Hazard Review

Flying Objects	Noise	Crushing & Pinching
Traffic		

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Wear appropriate personal protective equipment consistent with the hazard. Eye protection is required.
4. Use tools in the manner for which they are designed.
5. Keep hands and feet clear of cutter blades when machine is in operation.
6. Operators should make sure rubber safety shield is in place before operating equipment.
7. Do not fill fuel tank or remove fuel cap while engine is running.
8. Do not work in front of machine when it is in operation, unless the machine is designed for both front and rear operation.

Related SOPs

General SOPsChapter 10

Mulch Blower

Class Code 4113

Hazard Review

Backing	Mounting/Dismounting	Flying Objects
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1. Supervisors shall verify that all operators are capable and qualified to operate the mulch blower.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Make sure area to be mulched is clear of people, other equipment and vehicles.
4. Operators are to be aware that there will be flying debris. Watch for passing motorists.
5. Keep height of blower chute properly adjusted.
6. Keep chain drive and motor rpm's adjusted only to amount needed for proper mulching application.
7. Wear appropriate personal protective equipment consistent with the hazard. Eye protection is required.
8. Ensure safety chains are hooked before towing.
9. Ensure engine is off and key removed before cleaning, adjusting or repairing separator or blower.
10. Be careful of footing and do not wear loose clothing when feeding mulch spreader.
11. Never attempt to start or operate the machine except from the operator's station.
12. Operators should make a visual inspection of work area prior to beginning work.
13. Watch for flying debris during mulching operations. Be aware of wind direction and try to work upwind. Restrict usage during high winds.

Related SOPs

General SOPsChapter 10 Crewcab and Flatbed TrucksPage 12A-29
Trailers and Towed EquipmentPage 12B-29

Pile Driving Analyzer

Hazard Review

Noise	Poisonous Plants, Snakes and Insects	Crane Operation
Moving Equipment	Heights	Falling Objects
Slip, Trip and Fall		

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator’s manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Wear appropriate personal protective equipment consistent with the hazard.
3. Be aware of poisonous plants, snakes and insects. Wear long sleeve shirts, gloves and high top boots when hazards cannot be avoided.
4. Do not stand near operating hammer as a variety of parts of potentially large size may fall and could cause serious injury.
5. Be extremely careful when the piles or the leads are lifted by the crane. Always watch during this process and plan an escape route in case of crane failure.
6. When working near the hammer, make sure the hammer weight is not in a lifted position. Never place your arm or head between the pile top and a lifted hammer.
7. If it becomes necessary to climb the leads, be sure the contractor and crane operator are aware that this is being done. The hammer should not be started while DOT employees are on the leads.
8. Be careful of moving construction equipment and stay clear of the crane when it is rotating.
9. Be aware of loose material, excavation drop-off, tripping hazards, uneven ground and other obstructions.

Related SOPs

General SOPs	Chapter 10	Pile Driving	Page 11B-53
Generators.....	Page 12B-12	Hand Tools (Power and Manual)	Page 12B-13

Post Puller

Hazard Review

Traffic

Crushing & Pinching

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment and be familiar with the operator's manual.
3. Do not use any equipment that is unsafe. Report needed repairs promptly.
4. Ensure detachable puller is in good working order and is correctly attached.
5. When transporting, ensure that post puller is properly secured.

Related SOPs

General SOPsChapter 10 High Pressure Hoses.....Page 11E-5

Power Washer

Hazard Review

Pressurized Water	Flying Objects	Traffic
Slip, Trip and Fall		

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Insure all connections are correctly attached and tight.
4. When using an intake hose, make sure hose is not drawing mud, sand or other bottom material into the pump system.
5. When using 0 and 15 degree tips for the powerhead/wand assembly, be extremely careful not to direct flow towards air hoses, safety lines, equipment or other personnel. Remember that these tips force water at a velocity high enough to cut through concrete.
6. Be aware of slippery conditions.
7. Never leave equipment unattended with the engine running. Shut engine off when not in use.
8. Wear appropriate personal protective equipment consistent with the hazard. Eye protection is required.
9. Operator should make a visual inspection of work area prior to beginning work.

Related SOPs

General SOPsChapter 10 High Pressure Hoses.....Page 11E-5

Crawler Rock Drill–Hydraulic

Class Code 1717

Hazard Review

Utility Lines	Backing	Mounting/Dismounting
Steep Terrain	Flying Objects	Rock Dust
Noise		

1. Supervisors shall verify that operator is capable and qualified on equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not operate equipment that is unsafe.
3. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from vehicle.
4. Always check to the rear before backing and use an observer whenever available.
5. Wear appropriate personal protective equipment consistent with hazard.
6. Be aware of overhead and underground utility lines when operating equipment.
7. Operators shall make a visual inspection of work area prior to beginning work.
8. Stay off slopes too steep for safe operation.
9. Wear appropriate personal protective equipment consistent with the hazard. Hard hat, eye protection and safety shoes must be worn. PFDs and safety harnesses may also be required.
10. Never attempt to start or operate the machine except from the operator's station.
11. Operators should be aware of employees and others on foot in work zones.
12. Never leave equipment unattended with the engine running. Shut engine off when not in use.
13. Choose safest location possible to park equipment. Avoid parking in other equipment's blind spot.

Related SOPs

General SOPs	Chapter 10	Explosives.....	Page 11E-3
Truck Tractor and Trailer	Page 12A-36		

Scaffolding

Hazard Review

Slip, Trip and Fall	Falling Objects	Extreme Heights
Noise		

1. Check condition of staging, hangers and railing before use.
2. The combined load of workers, materials and tools shall not exceed manufacturer's rated capacity.
3. Scaffolding shall not be used without proper handrails and toeboards as specified by OSHA.
4. Keep loose tools and materials clear of walkway.
5. Do not work or walk under a scaffold that is being used.
6. Do not overextend to reach something. Move scaffold to the work area.
7. Do not sit or climb on handrails to gain height.
8. Establish safe means of entry/exit onto/from scaffold.
9. Wear appropriate personal protective equipment consistent with the hazard. Hard hat, eye protection and safety shoes must be worn. PFDs and safety harnesses may also be required.
10. Employees should be aware that proper foot placement and balance is important for safe operation.
11. Scaffolds shall not be supported solely by cable, chain or rope systems. Use only roller beam clamps or scissor units.

Related SOPs

General SOPsChapter 10 Hand Tools (Power and Manual)Page 12B-13

Snow Plow

Class Code 4128, 4230, 4231, 4232, 4233

Hazard Review

Stationary Objects	Lifting	Traffic
Pinching/Crushing	Inclement Weather	Hooking/Unhooking

1. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
2. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
3. Inspect plows and components prior to use as follows and repair or replace any items found to be deficient:
 - a. Check plow, plow frame and shear flange for cracks, broken welds or loose bolts.
 - b. Check shear flange and pins for proper bolt grade, size, tightness and condition.
 - c. Check safety chains and blade for wear and condition.
 - d. Check for leaky or damaged hydraulic lines, fittings or cylinders.
 - e. Check lube points and lube as needed.
 - f. Check all controls to ensure smooth and correct operation.
4. Be aware of pinch points when installing or removing plows. Keep your hands away. Do not lift with your back. Get help and use lifting equipment as needed.
5. Always use safety chains or protective blocking when changing blades or performing other work on plows; never trust the hydraulic system!
6. Adjust your plowing speed to the conditions, i.e. traffic volumes, pedestrians, highway conditions, material to be plowed, terrain and visibility.
7. While plowing, watch for bridge joints, water meters, manholes, railroad tracks, etc.
8. Check the condition of the plow periodically during use using the guidelines provided in number 3a, 3c and 3d above.
9. The use of flags on ends of plow is recommended for visual contact by driver.
10. When possible, plow operators should inspect plowing route and note or mark hazards.
11. For long distance travel (outside normal work area), snow plow should be chained in the up position to relieve stress on the cylinder and lifting mechanism.

Related SOPs

General SOPs	Chapter 10	Crew Cab and Flatbed Trucks	Page 12A-29
Dump Truck.....	Page 12A-30	In-body Salt Spreader.....	Page 12B-25
Material Spreader-Tow Type.....	Page 12B-26	Tailgate Spreader	Page 12B-27

Rotary Soil Conditioner

Class Code 4248

Hazard Review

Backing	Flying Objects	Mounting/Dismounting
Noise	Utilities	

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Check area to be tilled, removing any foreign objects.
4. Check area for underground water lines, electric cables or pipes.
5. Keep all guards and safety covers in place at all times.
6. Always shut off power source before cleaning tines or making adjustments.
7. Wear appropriate personal protective equipment consistent with the hazard.
8. Operator should be aware of employees and others on foot in work zones.
9. Stay off hills and slopes too steep for safe operation.

Related SOPs

General SOPs	Chapter 10	Wheel Tractor	Page 12A-25
Tractor Attachments.....	Page 12B-28		

In-Body Salt Spreader (5 Cu. Yd. & 10 Cu. Yd.)

Class Code 4127, 4229

Hazard Review

Incident Weather	Flying Objects	Traffic
Mounting/Dismounting	Overloading	

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with operator's manual. Report all needed repairs promptly. Do not use any equipment that is unsafe.
3. Make sure lighting is working properly on truck and spreader.
4. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
5. Keep hands and body away from all moving parts and be aware of pinch points.
6. Never make any repairs or adjustments on the unit while it is in operation.
7. All personnel must keep clear of spread area.
8. Disengage PTO and depressurize all lines before disconnecting.
9. Make sure spreader is properly secured to truck prior to beginning operation.
10. Do not exceed weight limitations.
11. Obtain assistance when installing and removing spreader from truck as needed.
12. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
13. Spreader shall be calibrated consistent with predetermined application rate.
14. Spreader is to be cleaned and lubricated following each use.
15. Wear appropriate personal protective equipment consistent with the hazard. Eye protection is required when calibrating spreader.

Related SOPs

General SOPs	Chapter 10	Front End Loader.....	Page 12A-11
Dump Truck.....	Page 12A-30	Snow Plow	Page 12B-23

Material Spreader–Tow Type

Class Code 4234

Hazard Review		
Backing	Traffic	Inclement Weather
Hooking/Unhooking		

1. Supervisors shall verify that drivers are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator’s manual. Report needed repairs promptly. Do not use any equipment that is unsafe. Make sure lighting is working properly on truck and spreader.
3. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
4. Insure that pintle hook latch is engaged when spreader is attached to truck and safety chains hooked.
5. When parked, spreader shall be secured by wheel chocks to prevent rolling.
6. Spreader shall be calibrated consistent with pre-determined application rate.
7. Do not exceed weight limitations.
8. Keep hands and body away from all moving parts and be aware of pinch points.

Related SOPs	
General SOPsChapter 10	Front End Loader.....Page 12A-11
Dump Truck.....Page 12A-30	Snow PlowPage 12B-23

Tailgate Spreader

Class Code 4126, 4227

Hazard Review

Backing	Traffic	Pinching/Crushing
Hooking/Unhooking		

1. Supervisors shall verify that drivers are capable and qualified on equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe. Make sure lights are working properly on truck and spreader.
3. Plan ahead to minimize or eliminate the need for backing. Always check to the rear before backing and use an observer if available. Make sure back-up alarms are working properly.
4. Be aware of crushing or pinching hazards when installing, adjusting or removing spreader. Get help or use machinery if necessary.
5. Make sure spreader is securely attached prior to beginning operation.
6. Spreader shall be calibrated to be consistent with pre-determined application rates.
7. Spreader is to be cleaned and lubricated after each use.
8. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
9. Disengage PTO and depressurize all lines before disconnecting.
10. All personnel must keep clear of spread area.
11. Wear appropriate personal protective equipment consistent with the hazard. Eye protection is required when calibrating spreader.

Related SOPs

General SOPs	Chapter 10	Front End Loader.....	Page 12A-11
Dump Truck.....	Page 12A-30		

Tractor Attachments

Class Code 1703, 4106, 4108, 4109, 4122, 4133, 4140, 4246, 4249

Hazard Review		
Crushing or Pinching	Lifting	Backing
Loose Clothing		

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
4. Never stand between tractor and attachment during hooking or unhooking operation.
5. Use proper tools, pins, P.T.O., shafts, etc., for hook-ups.
6. Make sure all shields, covers and guards are in proper place and secure.
7. Be aware of crushing or pinching hazards when hooking-up, using, adjusting or removing the attachment.
8. Do not wear loose clothing.
9. Stay clear of all moving parts; shafts belts, drills, flywheels, fans, etc.
10. Be aware of lifting injury during hook-ups of heavy attachments. Get help when needed.
11. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.
12. Check frame for cracks and loose bolts.
13. Wear appropriate personal protective equipment consistent with the hazard.

Related SOPs	
General SOPs	Chapter 10 Wheel TractorPage 12A-25

Trailers and Towed Equipment

Class Code 3200, 3201, 3204, 3208, 3301, 3302, 4145

Hazard Review

Backing	Unsecured Loads	Hooking/Unhooking
Debris on Bed		

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Operators shall perform a visual and manual check of the "pintle hooks" to ensure that they are secure before the truck and attachment are put to use.
4. Make sure cargo is properly loaded and secured using only approved chain and load binders. Safety chains are to be used on any attachment in tow. Ensure that the chains are of the proper strength for the load and are properly secured to both the vehicle and attachment to be towed.
5. Be aware of height and width of load.
6. Never load a trailer beyond its recommended capacity.
7. Do not allow anyone between truck and trailer when backing to hook trailer.
8. Plan ahead to minimize the need for backing. Always check to the rear before backing and use an observer when available. Make sure back-up alarms are working properly.
9. Make sure trailer-bed and ramps are clear of any debris.
10. Make sure tilt-beds or ramps are secure before putting trailer in use.
11. Hook, unhook, load and unload on stable ground with trailer secure.
12. Be sure taillights and turn signals are in view when towing any attachment that does not have taillight hookup.
13. Observe towing speed limit if applicable.
14. Operators shall be responsible for securing permits for all oversize loads.

Related SOPs

General SOPs	Chapter 10	Crew Cab and Flatbed Trucks	Page 12A-29
Dump Truck.....	Page 12A-30	Geotechnical Truck and Trailer	Page 12A-33
Truck Tractor and Trailer	Page 12A-36		

Trenching Machine

Class Code 4118

Hazards

Underground Utilities

Pinching/Crushing

1. Supervisors shall verify that operators are capable and qualified on each type of equipment before allowing the equipment to be operated unsupervised.
2. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
3. Have all persons stand clear when machine is started and operating.
4. Operators should make a visual inspection of work area prior to beginning work. Clear area to be trenched.
5. Locate and mark any underground utilities or water lines before trenching.
6. Do not work in front of machine when it is in operation.
7. Secure machine properly before transporting.
8. Unload machine at a location protected from traffic exposure.
9. Obtain assistance when necessary to physically handle machine.
10. Wear appropriate personal protective equipment consistent with the hazard.
11. Do not wear loose clothing and keep shirrtails in when operating.
12. Do not work on chain while machine is running.
13. Do not fill fuel tank or remove fuel cap while the engine is running.
14. Stay clear of all moving parts, cables, shafts, belts, flywheels, etc.
15. Never leave equipment unattended with the engine running. Shut engine off when not in use.
16. When mounting or dismounting equipment, use steps and handholds provided. Do not jump from the vehicle.

Related SOPs

General SOPsChapter 10 Trailers and Towed EquipmentPage 12B-29

Underwater Air Lift

Hazard review

Suction

Lifting

1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Insure all connections are correctly attached and tight.
3. Secure air supply hoses to upper portion of lift.
4. Secure line at outlet to direct discharge away from personnel and equipment.
5. Keep hands and air lines clear of intake.

Related SOPs

General SOPsChapter 10 High Pressure Hoses.....Page 11E-5

Water Pump

Class Code 3500-3511

Hazard Review

Pressurized Water	Lifting	Slip, Trip and Fall
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1. Operators shall perform a pre-operational check of their equipment. Be familiar with the operator's manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. High pressure hoses should not be kinked. Check hose fittings for proper connections.
3. Operator should never leave machine while pumping is in process.
4. Only nozzle operator will direct the pump operator when to start pump.
5. Make sure all hoses and nozzles are in good shape.
6. Do not stand over hoses.
7. Watch for slipping/tripping hazards in the work area.
8. Use proper lifting procedures for moving hose and placing bagged material.
9. Clean machine properly and thoroughly at end of shift.
10. Do not fill fuel tank or remove fuel cap while engine is running.

Related SOPs

General SOPsChapter 10